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OF THE

ILLINOIS

STATE DENTAL SOCIETY.

14 Th

TRANSACTIONS FOR THE YEAR 1878.

"ARTEM DOCTRINA SANITATEM ARTE."

CHICAGO:
JAMESON & MORSE, PRINTERS, 162–164 CLARK STREET.

1878.

ILLINOIS STATE DENTAL SOCIETY.

Organized July 24th, 1865.

OFFICERS 1878-9.

PRESIDENT.

S. M. STURGISS, - - - - - - QUINCY.

VICE-PRESIDENT.

C. A. KITCHEN, - - - - - - ROCKFORD.

SECRETARY.

E. NOYES, - - - - - - - CHICAGO.

TREASURER.

E. C. STONE, - - - - - - GALESBURG.

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LIBRARIAN.

E. B. DAVID, - - - - - - ALEDO.

STANDING COMMITTEES, 1878-9.

EXECUTIVE COMMITTEE.

J. F. MARRINER, Ottawa.

J. N. CROUSE, Chicago. J. M. HURTT, Peoria.

BOARD OF CENSORS.

M. S. DEAN, Chicago.

G. V. BLACK, Jacksonville. K. B. DAVIS, Springfield.

PUBLICATION COMMITTEE.

E. NOYES, Chicago. C. R. E. KOCH, Chicago.

COMMITTEE ON LEGISLATION.

G. H. CUSHING, Chicago.

G. S. MILES, Jerseyville. K. B. DAVIS, Springfield.

COM. ON INFRACTION OF THE CODE OF ETHICS.

J. N. CROUSE, Chicago.

G. V. BLACK, Jacksonville. J. F. MARRINER, Ottawa.

Minutes of Transactions

OF THE

Fourteenth Annual Session.

By E. D. SWAIN, Secretary.

The Fourteenth Annual Session of the Illinois State Dental Society, convened in the Young Men's Christian Association Rooms, Rockford, Ill., Tuesday, May 14, 1878, and was called to order at 10 A. M., by the President, Dr. C. R. E. Koch, of Chicago.

The session was opened with prayer by the Rev. F. Woodbury, of Rockford.

The following named members were present:

Black, G. V., Jacksonville.
Brophy, T. W., Chicago.
Babcock, N. E., Rockford.
Call, E. B., Peoria.
Campbell, J., Bloomington.
Clark, A. B., Chicago.
Cushing, G. H., Chicago.
Crouse, J. N., Chicago.
Davis, J. A. W., Galesburg.
Davis, K. B., Springfield.
David, E. B., Aledo.
Dean, M. S., Chicago.
Freeman, D. B., Chicago.
Fisher, J. K., Bloomington.
Gardiner, F. H., Chicago.
Harlan, A. W., Chicago.
Hurtt, J. M., Peoria.
Harrington, G. H., Delavan.
Kitchen, C. A., Rockford.
Krape, W. W., Polo.
Kingsley, G. P., Freeport.
Koch, C. R. E., Chicago.
Magill, W. T., Rock Island.
Marriner, J. F., Ottawa.
Mills, W. H. Freeport.
Ormsbee, W. W., Geneva.
Stevens, W. A., Chicago.
Sturgiss, S. M., Quincy.
Stone, E. C., Galesburg.
Swain, E. D., Chicago.
Talbot, E. S., Chicago.
Townsend, H. H., Pontiac.

Dues were sent by E. F. Davis, of Galesburg; R. Matthews, Pontiac; A. E. Matteson, Kewanee; G. S. Miles, Jerseyville; J. W. Stephens, Dixon.

Of the Honorary members, Dr. S. C. Chittenden, of Madison, Wisconsin, and C. Stoddard Smith, of Newark, N. J., were present.

[During the three days session, the following named new members were elected, and qualified, they each having been examined by the Board of Censors, and favorably reported upon, which is reported at this place for convenience sake.]

New members elected:

W. B. Woodward, M.D., D.D.S., Peoria.
W. W. Woodburn, Dixon.
H. C. Gill, Rockford.
G. T. Carpenter, D. D. S., Chicago.
Jas. J. Cresswell, Galena.
Jas. M. Carmony, Mt. Carroll.
G. F. Hoadley, Byron.
M. L. Hannaford, Rockford.
D. J. Pollock, Sterling.
G. O. Howard, Galena.

REPORTS OF OFFICERS.

The Secretary's Report was then read by Dr. Swain, of which the following is a synopsis:

Active members in good standing last year,	88
Restored by order of Executive Committee,	3
Gained by election last session,	6
Total,	97
Loss by non-payment of dues: E. V. H. Alexander, Sterling; D. Burrell, Freeport; W. R. McManingle, Lacon; E. J. Perry, Sycamore; E. Stevens, Bloomington,	5
Leaving in good standing at this time,	92

The receipts from dues and initiations have been $338, for which amount the Treasurer's receipts are held.

Report accepted and referred to Executive Committee for auditing.

The Treasurer, Dr. Kitchen, reported his total receipts during the year:

From last Treasurer,		$70.81
From Dr. Swain, Secretary,		338.00
From Publication Committee,		8.15
		$416.96
Expenditures on Vouchers,	$360.00	
Cash on hand,	56.96	
		$416.96

Report was received and referred to Executive Committee for auditing.

REPORTS OF COMMITTEES.

The COMMITTEE ON PUBLICATION submitted their report, of which the following is a synopsis:

Seven hundred and fifty copies of the Transactions were published and distributed, as in previous years; also 11,500 copies of the pamphlet, "Our Teeth" have been published and sold; and 500 copies of Constitution and By-Laws, with Amendments up to date, have been printed. The following is their financial exhibit:

Expended on Transactions:		
For Printing Transactions,	$200.00	
Printing Postal Cards,	4.50	
For Expressage and Postage,	15.60	
For Engraving,	15.00	
Total expense on Transactions,		$235.10
Expended on "Our Teeth;"		
For Printing Pamphlets (there is due on this acc't, in addition, on printing, bill. 41.45),	$149.10	
Printing Circulars,	3.00	
Expressage, Copyright, Postage, &c.,	7.75	
Wood Cut and Electrotype	11.00	
Total on "Our Teeth,"		$170.85
Expended on Constitution and By-Laws:		
For Printing,		22.50
Cash returned to Treasurer,		8.15
Total Expended by Committee,		$436.60
Received from Advertising in Transactions,	$40.00	
Received from Sale of "Our Teeth,"	180.10	
Received from Treasurer, $185.00 + 9.00 + 22.50	216.50	
Total received,	$436.60	

The Committee reported as due from H. C. Corfield & Co., of Philadelphia, Pa., $10.00, for advertisement, which they had tried to collect, but without success; and they recommend that an order be drawn on Treasurer, in favor of C. Stoddard Smith, the publisher of "Our Teeth," for the balance of $41.45, due him on this account.

The recommendation of the Committee was approved, and the report was received and referred to Executive Committee for auditing.

The Legislative Committee reported through Dr. Cushing, that they had no report to make, as the Legislature had not been in session since our last meeting. This report was received and committee continued.

The Executive Committee reported the printed programmes as mailed before the session to the members, as their arrangement for holding the session, which was adopted.

The Committee on Ethics asked for further time in which to report; granted.

The Board of Censors, reported a vacancy on their Board, Dr. Miles being absent. The Chair appointed Dr. K. B. Davis, of Springfield, to act as a member of the Board, *pro tem.*

Dr. Cushing reported a vacancy on the Executive Committee. It was moved that the Chair appoint a member to fill the vacancy; carried. Chair appointed Dr. J. F. Marriner, of Ottawa.

MISCELLANEOUS BUSINESS.

Resignations were received from E. H. Kilbourne, of Aurora; O. Carpenter, of Streator, and C. R. Dwight, of Danville, as members of the Society. They were all, upon motion, accepted.

The Secretary read a communication from J. D. Caulk, Camden, Delaware, enclosing specimens of his Gutta Percha Stopping. The material was ordered to be given to the Secretary, with instructions that he report upon the properties of the same at next annual session.

Dr. Brophy moved that the delivery of Dr. Dean's essay be made the special order following the miscellaneous business on Wednesday evening. Carried.

Society then adjourned till two P. M.

AFTERNOON SESSION.

Meeting called to order at time appointed, President in the chair.

Minutes of the morning session were read and approved.

Dr. Cushing, in the name of the resident dentists of Rockford, extended an invitation to the members of the Society to a banquet on Friday evening. Invitation was accepted.

A motion to invite dentists from out of the State and local physicians present to take part in the discussions of subjects brought before the Society was carried.

Dr. Cushing stated that he had received a request from a young lady to make a proposition for her in regard to an entertainment to consist of readings, before this Society. It was moved by Dr. Dean that the Society accept the proposition, and that we attend on Friday evening this entertainment, instead of the banquet. Lost.

The Annual Address was then read by the President, followed by a brief discussion, after which Dr. Black, of Jacksonville, read a paper on "*Neuralgia*," which was discussed until the hour for adjournment.

Society adjourned until 9.30 to-morrow morning.

SECOND DAY.

Morning Session.

Society called to order by the President at hour adjourned to. Meeting was opened with prayer by the Rev. Dr. Kerr.

Minutes of last session were read and approved.

Upon motion, the action of the Society, accepting the invitation to the banquet on Friday night was reconsidered, and a motion to accept it for Thursday night instead, if agreeable to the local dentists, prevailed. The hour for the banquet was fixed at 9.30 o'clock, P. M.

Invitations were extended on behalf of the watch factory to visit that institution, and Mr. Richardson to visit the new county building. Accepted for two o'clock P. M., Thursday.

Dr. J. F. Marriner then read an essay, "*Are We Progressing?*" which was followed by discussion, when the presence of a voluntary essay, sent by Dr. Noyes, on a subject related to the one under consideration was announced; and it was ordered to interrupt further discussion until after the reading of this paper. Dr. Cushing then read Dr. Noyes' essay, entitled "*Why do Operations Fail?*" after which discussion was resumed.

Society adjourned.

EVENING SESSION.

The afternoon having been entirely devoted to clinics, the Society assembled for transaction of business at eight o'clock P. M., President in the chair.

Minutes of morning session were read and approved.

It was moved, inasmuch as the regular clinical operators for to-morrow were not present, that the programme for Thursday afternoon be suspended. Carried.

Dr. Crouse then moved that inasmuch as the programme for to-morrow afternoon had been changed, the action accepting the invitation to visit the watch factory be reconsidered. Carried.

It was then decided that owing to the pressure of business, we do not accept the invitation, and instruct the Secretary to convey the thanks of the Society to the proper officers, explaining our inability to accept.

The special order for the evening being the essay by Dr. M. S. Dean, he delivered a lecture upon "*The Epithelia and some of their Derivatives*," which was accompanied by numerous illustrations explanatory of his remarks. This was followed by discussion.

Society adjourned till 8.30 A. M., to-morrow.

THIRD DAY.

Morning Session.

Society met pursuant to adjournment, President Koch in the chair. Minutes of last session were read and approved.

Dr. Talbot offered the following resolution:

Resolved, That this Society does not approve of the use of chloroform as an anæsthetic in the extraction of teeth, which was discussed at some length, after which, a substitute, offered by Dr. Crouse, was adopted, as follows:

Resolved, That this Society does not approve of the use of chloroform by dental practitioners in extracting teeth or other minor operations, or the use of any anæsthetic by incompetent men practicing dentistry.

Dr. Cushing called attention to a device for repairing accidental breaks in the rubber dam while operating, presented by Dr. Magill, of Rock Island. A vote of thanks was tendered Dr. Magill for his donation to the Society.

The Secretary read a communication from several members asking to be furnished with the Society's certificate of membership. The communication was laid upon the table.

Dr. Chittenden, of Madison, Wis., tendered an invitation to the members of the Society to attend the Wisconsin State Dental Society, July 9th, and promised a profitable and pleasurable time.

Upon motion, an essay was then read by Dr. J. A. W. Davis, on "*Filling Proximal Cavities in Bicuspids and Molars*," which was discussed in conjunction with the papers of Drs. Marriner and Noyes.

The consideration of the subjects in these papers having been passed, Dr. C. S. Smith, of Newark, New Jersey, was invited to speak upon the subject of Mechanical Dentistry, Celluloid being the special theme. Dr. Smith explained at some length the manufacture of Celluloid, and the efforts the company were making to overcome the difficulties encountered in its practical working for dental plates.

Dr. K. B. Davis offered the following resolution:

"*Resolved*, That this Society expresses its appreciation of the action which the Celluloid Manufacturing Company recently took in employing Dr. C. Stoddard Smith to superintend their dental department, which we believe will result in improved dental plates, and in the methods of their manipulation and an increased use by the profession." Adopted.

Dr. Cushing then read an essay by Dr. G. S. Miles, of Jerseyville, on "*Operative Instruments*," which was discussed.

Society then adjourned till 1.30 P. M.

THIRD DAY.

Afternoon Session.

Meeting called to order at 1.30 P. M., by the President. Minutes of morning session were read and approved.

Dr. Miles' Essay and yesterday's Clinics were then discussed, after which Dr. Cushing read a paper on "*Bleaching Teeth*," which was followed by discussion.

Dr. C. Stoddard Smith was then invited to read an essay he had voluntarily prepared, entitled: "*Is Dentistry a specialty of Medicine?*" with which invitation he complied. A vote of thanks was tendered him for same, after which the subject was discussed.

The Treasurer was instructed to pay the sum of $50.00 to the Secretary, for services.

The President and Secretary were directed to give certificates to such members as may express a desire to attend the next meeting of the American Dental Association, as Delegates from this Society.

The Committee on Ethics reported as follows:

"It has come to the notice of your Committee on Ethics, that members of this Society are advertising, in different ways, the use of Nitrous Oxide, on their signs, in their newspaper, cards, and on their appointment cards, &c., &c. This, of itself, might not be considered sufficiently unprofessional to be brought to the notice of this Society, but they not only advertise that they administer it for the painless extraction of teeth, but add, also, that it is done with perfect safety. It is the opinion of your committee that no one should advertise to administer any anæsthetic with perfect safety. Some members also use signs designed to attract the attention of the public, such as teeth filled with amalgam and galvanized, or filled with gold, mounted in a human skull or in a case. Artificial teeth in motion or otherwise; a large imitation of a tooth, suspended near the entrance of their offices. Sometimes half the side of the building they occupy is disfigured by their signs, and some, not satisfied with this, have even encroached upon their neighbors' buildings. It is the opinion of your committee that the time has come when the members of this Society should put out signs which will indicate that the owners are professional men. In bringing these things to the notice of this Society, it is with a view of getting the sense of this body upon the subject, and also with the hope that by calling the attention of those who are advertising in this way, to the fact that it is unprofessional, it may be sufficient to effect all necessary reforms."

Report was accepted and adopted, and the committee continued.

The Executive Committee reported that they had examined the accounts of Treasurer, Secretary and Publication Committee, and found them correct. This report was adopted.

A vote of thanks was tendered the Common Council, of Rockford, for the free use of its meeting hall for clinics.

It was decided to devote one-half day of next year's Session to clinics, to be in the forenoon or afternoon, in the discretion of the Executive Committee.

Dr. Swain was invited to give a demonstration in Mechanical Dentistry, at the same time the clinic is held.

A vote of thanks was tendered the resident Dentists of Rockford, for their courteous hospitality, and to the Holland House, which so well entertained the members.

The Publication Committee was given discretionary power to dispose of another edition of "Our Teeth," and to make such arrangements with the American Dental Association as they deem necessary, should that Association conclude to approve of the pamphlet.

The Publication Committee was instructed not to mail copies of the Transactions of this Society, gratuitously to those who have been dishonorably dropped from its roll.

ELECTIONS.

Peoria was chosen as the place in which to hold the next Annual Session.

Upon the nomination of the President, Dr. K. B. Davis, of Springfield was chosen as a member of the Board of Censors, for three years.

Clinical operators for the next Annual Session as follows were elected: Drs. Campbell of Bloomington, and Crouse, Harlan, Brophy and Talbot of Chicago.

The election of officers resulted as follows:

President,	S. M. Sturgiss,	Quincy.
Vice-President,	C. A. Kitchen.	Rockford.
Secretary,	E. Noyes,	Chicago.
Treasurer,	E. C. Stone,	Galesburg.
Librarian,	W. W. Ormsbee,	Geneva.
Executive Committee,	J. F. Marriner, Chairman,	Ottawa.
	J. N. Crouse,	Chicago.
	J. M. Hurtt,	Peoria.

The newly elected officers were then installed; Dr. Sturgiss, the new President, thanking the Society for the honors conferred.

The President was invited to deliver the next Annual Address.

The Secretary and Dr. Koch, were appointed a Publication Committee, with power to condense and revise.

A vote of thanks was tendered to Dr. Dunn, of Rockford, for his kindness in inviting and admitting the members to his fine museum; also to the clergymen who so kindly gave their services in opening our daily sessions.

There being no further business, the Fourteenth Annual Session was adjourned.

ADDRESSES, ESSAYS AND DISCUSSIONS.

ANNUAL ADDRESS.

By President C. R. E. Koch.

Gentlemen:

The cycle of another year is complete, and again we are assembled to compare and exchange the observations and experiences since our last gathering; to discuss these, and to draw conclusions from them; and when this brief season of gleaning shall have passed, to leave this City of Reapers, rich in the garnered store of knowledge, and with new light to guide us in our daily duties during the coming year.

It has been the habit of our profession on occasions like this to refer with pride to its rapid progress, both as an art and a science, and justly so, but we must not expect that growth in *this respect* will be as rapid as in the past. Adult age has been reached when growth simply exceeds by a very little, the actual waste of tissue. We are now, let us hope, filling out the proportion of vigorous manhood upon the frame of the fast-grown child. While the science underlying our art is, no doubt, being better understood from year to year, by a greater number in our ranks, thanks to our Societies' journals and colleges, yet I am not aware that there is to be reported any new discovery in our science during the past year.

The fact that we were far in advance in mechanical ingenuity and operative skill over our brethren across the water, and yet had to acknowledge that to them we had to look for the foundation upon which we reared the superstructure, seems to have acted as a stimulus to the pursuit of scientific investigations among us, as is evidenced by the contributions to our journalistic literature. Although no startling discoveries have yet crowned these labors, yet they portend in a not too far distant future, a recognized position of our entire profession as a learned body, and one which shall command respect not only because of its ingenious and skillful men, but also because of its thinking men

Great credit is due to gentlemen who make the sacrifices necessary in order to pursue such researches, and if the reports of the progress of their investigations are made in such a manner as to show that they are careful and exact in their procedure and observation, and honest and truthful in the statement of their data, the profession should not only give them an attentive ear, but encourage them to proceed in their work, although the deductions made by them may be totally fallacious. The facts eliminated by them may be used by other minds in the discovery of truth. But the desire for sensationalism which pervades the religious, the political, the financial and the social world seems to be spreading, and our branch of the scientific world has caught the infection. In finance, the struggle was not against gold, but in favor of silver. With us the fiat has gone forth: He who would use gold to save teeth, let him be anathema! This seems, indeed, an age of iconoclasm and innovation; nothing, no matter how fondly clung to with the strength of faith, seems to command the respect of the ruthless hand of the despoiler. Among us the apostles of a new creed have commenced their work; there seems to be a tripartite alliance formed, for the purpose of preaching from the text: *Gold is utterly unfit to save teeth.* They tell *you*, gentlemen, who have filled teeth with gold for the past twenty or thirty years, and believed, *because you saw*, that you had succeeded in saving them,—do not believe the evidence of your own eyes, but accept the truth as we reveal it to you!

In the first number of the *Dental and Oral Science Magazine*, there appears an article on this new revelation which, for recklessness of statement and sensationalism, probably exceeds anything ever seen in our literature. The article purports to prove the truth of the ideas advanced by *Drs. Palmer and Chase*, and pulls down a supposed creed of ten articles, which reminds one forcibly of Don Quixote's battle with the windmills; and then it proceeds to erect ten new articles of faith, some of them utterly regardless of demonstrated and demonstrable truth, and the careful and honest observations of a host of men whose statements deserve our confidence and respect.

The author of the article starts out with the naive statement "that for more than twenty years he has not known what it was to be on the right side." It ought to be a matter of regret that he has not discovered it yet. Certainly no fair minded man can read the article without acknowledging that this portion of the paper, at least, is

deserving of unqualified belief. In another place we are told that twenty-two years ago, Dr. Arthur enunciated the practice of leaving decay in the bottoms of cavities, and that out of 4,500 dentists then in the United States, Dr. Louis Jack and the author were the only followers of Dr. Arthur, and that now this was the accepted practice. The inferential argument being that if then he was right, and 4,497 were wrong, his statement now, under a similar condition of things, should be accepted as infallible.

The author fails to show how he knew that Drs. Arthur, Jack, and himself were the only ones who adopted that practice, and he is likewise deficient in evidence as to the means he took to ascertain what the practice was, in this respect, of the other 4,497. Again, Dr. Elisha Townsend is cited as saying, twenty years ago, that teeth could be saved with amalgam which he could not save with gold. This, certainly, could not have been news to the author, as long before the oldest practitioner now living commenced to practice, teeth were filled and saved with amalgam made of Mexican and American coin, reduced with a file, which the operators could not have saved with gold.

Fearing that you may not have seen the article referred to, I will repeat to you the ten articles of faith of the Accepted Creed and of the New Departure as laid down in it:

ARTICLE I. A. C. *Gold is the best thing to save teeth.*

ARTICLE I. N. D. *In proportion as teeth need saving, gold is the worst material to use.*

You will perceive that the accepted creed, as stated, is hardly what a large majority of the profession would be willing to subscribe to, without the addition of a qualifying clause. The New Departure is the language of Professor Chase, and you are all fully conversant with the arguments advanced by him to support this position, hence we will not touch upon that here. The author proceeds to tell a sad story of his experience with gold fillings, from which it appears evident that either he was very unfortunate in the discrimination between cases, or he had patients troubled with an unusual proportion of soft teeth, or else that he was not skillful in the manipulation of gold.

ARTICLE II. A. C. *Some have faith in contour; others have faith in separations.*

ARTICLE II. N. D. *We do not believe that either has much to do with the final result.*

Again he begs the question on the Accepted Creed, and on the New Departure as well. The creed, so far as there may be one, would probably have been more correctly stated. Judgment is essential as to where to contour and where and how to separate, and above all things it is important that the operation should be carefully and judiciously performed in every particular. He very correctly says that neither (of itself alone) will have much to do with the final result.

ARTICLE III. A. C. *Failure in operations is mainly due to defective manipulation.*

ARTICLE III. N. D. *Failure in operations is mainly due to incompatability of filling material with tooth bone.*

Evidently the author has been taking a Rip Van Winkle nap, and absent from the annual gathering of our societies. He shows conclusively that he has not read our current literature, and that his orbit of observation upon the topic of what the profession accepts as truth must be confined to very narrow limits. The thinking men of the profession, and they are not few, have long since ceased to ascribe *all* failures to defective manipulation, and are fully convinced that there are some laws or causes not yet understood that act as factors in bringing about these failures, though in many cases the nature of the failure bears the proof of a defective original operation unmistakably upon its face.

To discover these to us yet hidden causes, should be the province of science. Many causes for failures formerly unknown have already been detected, and it may be safely asserted that failures with men who use their brains as well as their hands are fewer than formerly.

But why should we expect to see the results of our efforts always successful? Or why should we teach our patients to expect such results? Is it honest to teach them to look upon our services as final and everlasting, when we know there must be a doubt? Do we not degrade the dignity of our calling by promising what we know cannot be a certainty, to the low level of charlatanry, and thereby block the wheel of its progress? God himself created man perfect, in his own image. How long did he remain so? In religion, in morals, in commerce, in agriculture is there always success? Does the Physician always cure disease, and if he does cure, may not the patient be sick again? Then I ask you, gentlemen, if it is true that full and complete success is not anywhere, why should we feel disheartened at

failures that we study and strive to reduce to as small a per cent. as possible? More we cannot give our patients; more we should not teach them to expect at our hands.

If the New Departure theory were indeed the full truth, why should we have failures with amalgam, tin and other materials, other than gold?

And if gold in some teeth, other materials in others, are incompatible, (electrically or chemically,) how are we to get sufficient discernment to prognosticate such incompatibility?

ARTICLE IV. A. C. *A tooth that is worth filling at all is worth filling with gold.*

ARTICLE IV. N. D. *A tooth that can be so treated as to be satisfactorily filled with anything is worth filling.*

This New Departure will no doubt receive an overwhelming majority in this body. But is it a New Departure? By the recital of the New Departure as such, the author conclusively proves that he has not attended the meetings of our societies or read their transactions.

ARTICLE V. A. C. *Unskilled and unscrupulous dentists fill with tin covered with gold, thereby causing galvanic action, pulpitis, death of the pulp, abscess and loss of the tooth.*

ARTICLE V. N. D. *Skillful and scrupulous dentists fill with tin covered with gold, thereby preventing decay, pulpitis and thereby saving the tooth.*

As this combination of materials is not generally employed, it is rather singular that there should be an established creed upon the matter. Article V. sounds very much as though somebody, whom the author regards as the dental profession, had *stepped on his toes.* While we have no desire to decry this operation as unskillful, yet the question that naturally arises is: If gold is so detrimental on account of its electrical potency, why not fill the tooth entirely with tin, as the tin being covered by the gold cannot act as a check upon the action of the acidulated fluid which creates the electric current between the gold and the tooth bone?

ARTICLE VI. A. C. *A filling to be good must not leak.*

ARTICLE VI. N. D. *A filling may be the best that is known for a tooth and leak badly.*

The author has told us that gold fillings eat themselves out of cavities, because of the electrical current created between the gold and tooth bone, by means of an acidulated fluid, which enters there; and now he bases this New Departure on the fact that if "*even vitiated saliva leaks between tooth bone and a material which is practically a non-conductor, and which has a surface neither bright nor oxidizable, then leakage is proved by experience to be not practically detrimental.*" Gutta-percha, he says, makes a leaky filling, yet preserves teeth, because of the above stated qualities, for many years, where gold fillings eat themselves out in from two to five years. If this is so, why should we fill teeth at all? If vitiated saliva is not injurious by effecting further disintegration in the cavity between the tooth bone and the filling, why should it be in the original cavity? Why should we try to keep vitiated fluids out of the cavity by means of any filling?

ARTICLE VII. A. C. *Gutta-percha, properly used, is good enough for temporary filling.*

ARTICLE VII. N. D. *Gutta-percha, properly used, is the most permanent filling material we possess.*

It is possible that gutta-percha has not been appreciated or valued as it deserves, but its want of resistance to the force of attrition, which the author admits certainly precludes it from being styled a permanent filling, where such resistance is an essential.

ARTICLE VIII. A. C. *A good gutta-percha filling, in its proper place, is better than a poor gold one.*

ARTICLE VIII. N. D. *A poor gutta-percha filling, in its proper place, is better than a good gold one.*

To illustrate this, the author cites the case of a mesial cavity of a left upper lateral incisor, which had been twice filled by one of the best operators, with gold, and failed, and was then filled temporarily by the same operator with gutta-percha, which latter filling bore evidence of hasty insertion in its overhanging edges, which he, the author, trimmed off, and already the gutta-percha filling has lasted longer than either of the gold ones. He says the gutta-percha filling which he saw made by the good operator, bore evidence of its hasty insertions in its overhanging edges, and he *assumes*, that the two gold fillings which he did not see, did not bear equal evidence of hasty insertions. And then, after he has trimmed off the edges, one would presume that the gutta-percha filling was a good one, as he mentions no other defect, and yet he pits this good gutta-percha filling against

two gold fillings that he did not see at all, to prove the truth of Article VIII, of the New Departure.

ARTICLE IX. A. C. *Amalgam, per se, is a poor filling.*

ARTICLE IX. N. D. *Amalgam, per se, is an excellent filling material.*

In this case the author qualifies and explains that he says it is the Accepted Creed, because in Taft, pp. 93, 94 and 95, the Creed of Ann Arbor and Ohio is thus laid down. He does not say by what process of reasoning he makes the Creed of Ann Arbor and Ohio stand for the Creed of the Dental Profession, nor does he show how he knows that the book is the creed of Ann Arbor and Ohio. He also disclaims regarding Amalgam as the *ultima thule*, and recognizes its deficiency as well as its excellence.

ARTICLE X. A. C. *The use of plastic filling materials tends to lower the standard of Dentistry, thereby diminishing its sphere of usefulness.*

ARTICLE X. N. D. *The use of plastic filling material tends to lower that Dentistry which has for its standard of excellence ability to make gold fillings, but very much extends the sphere of usefulness of that Dentistry which has for its standard of excellence ability to save teeth.*

With this he rests his case; and it is well he does. It is not desired to deny, in this paper, that there may be truth in the part that electrolyses plays in breaking down tooth tissues. Nor is it the intention to question that amalgam and other plastic fillings have all their proper sphere of usefulness, and should be employed with discretion. But how can we accept the truth of the teachings of this paper, when we see that the facts are not stated with that accuracy with which a scientific paper should be compiled, and when the very testimony of the witness impeaches his reliability?

In one place he tells us that twenty-two years ago he made 500 fillings—250 of gold, and 250 of tin or gutta-percha and amalgam, the amalgam taking the brunt of the battle. At the end of six years, undesirable evidence presented itself to his mind of the truth, that he could save teeth with amalgam that he could not have saved with gold. It is singular that it should have taken him six years to ascertain this, and that he should have been able to make 500 fillings and

just 250 of them with gold, and that he should see them all again in six years.

At another place he states, though disclaiming scientific accuracy, that he had followed the career of over 20,000 fillings, and finds that of gold, 71 per cent. fail in 15 years, and of amalgam 54 per cent., of average dentistry; and considering that the easy places are filled with gold, and the "forlornities" with amalgam, he deems this a hard showing for gold, and a good one for amalgam. For gutta-percha, in 2,000 cases of average duration of 8 years, the failures were but 8 per cent.

What weight such evidence can have we leave you to decide. The enquiry naturally arises, how could any one have seen twenty thousand fillings that had been in just fifteen years, or how could he know that they had been in that length of time? The showing of gutta-percha, certainly, is very creditable, but you will discover that he says these fillings had been in an *average* of eight years, not all of them eight years, hence this is hardly a fair comparison relative to the other materials, which had all of them been in full fifteen years. The question naturally arises, why, if gutta-percha is so much more permanent than either gold or amalgam, these latter are ever employed by the author?

In another place we are told that he has a list of over five hundred patients who have come to him since '57, and since then not one tooth has been extracted for them. And, again, he tells us that he has brought up thirteen hundred patients from childhood, and from the whole number only five permanent teeth have been extracted, and congratulates himself that all of his patients eat upon unbroken arches, above and below. In the light of our experience, we are led to ask: Do his patients never leave him? Do they never remove? Do they never die?

Gentlemen, I beg pardon for having dwelt so much at length upon this article, but it seems to me that it is necessary to protest against the introduction of such heresy in our journalistic literature. It may have been very fine to listen to the paper when read, and, perhaps, the positive magnetism of the author may have broken down any strong opposition of the negative elements; but at this distance, this influence has lost its potency, and we see that the meshes of the entire fabric are largely woven together with guess work. As no record is produced to back up the statements with, the value of the paper as a contribution to our science is not only reduced to zero, but

by being uttered by one of the reputed Fathers in Israel, it will do infinite mischief in misleading the young; yes, and the indolent, into practices which will not subserve the best interests of the trusts confided to them.

In the March number of the *Missouri Journal*, in an article by Dr. Black, we find the record of 457 gold and 102 amalgam fillings. Dr. Black shows that out of 243 gold fillings which had been in from 10 to 20 years (192 from 10 to 15, and 51 from 15 to 20 years), 231 were successes and 12 failures; and out of 27 amalgam fillings, 16 were successes and 11 failures. We see, then, by this tabulated statement, that of gold fillings 5 per cent were failures, and of amalgam fillings 41 per cent. You will perceive the disparity in figures between this statement and the other. While this statement would be deserving of the most confidence, as it shows that a tabulated record was kept of teeth actually examined, yet for the purpose of establishing the relative merits of the two materials, any such method of comparison is, to say the least, very unreliable. The word of patients has to be taken as to when the fillings were put in, which we all know is not to be depended upon as accurate, and then we have to deal with the operations of many operators, of different degrees of skill, which is another reason why a correct conclusion cannot be drawn in this way. The only manner in which such a record can be of any value, is to make it from our own registered operations, of which we know just under what circumstances and when they were made. If we can succeed in examining a number of such cases, we will, in all probability, strike a safe average of conditions. Experience has taught that all materials now employed in the salvation of teeth by filling, have their proper place, and in speculating or experimenting upon their relative merits, the question is not so much what material will best preserve all conditions of teeth, as what material is best, under certain conditions and locations; and to this end we must divest ourselves of all bigotry or prejudice against any material, and become eclectic. Not that we should now use one, now the other, just as our caprice, our cupidity or our indolence moves us, but the employment of the material should be based upon a careful observation of the conditions of the case, and upon a conscientious judgment formed upon the result of previous treatment of similar conditions; and whenever the large majority of the profession will cease from blindly following this man or that, and become posted in the ground work of general medical and

co-related sciences upon which our art rests, then we will indeed be entitled to full recognition as a scientific body. But how is this to be accomplished?

In our Constitution and By-Laws we have taken one step in this direction, by raising the standard of qualification for membership, and by making it obligatory upon members not to take students unless they will agree to attend two regular courses of lectures in a recognized Dental College. Let us see to it that this does not become a dead letter, and let us not encourage any young man to enter our ranks who does not exhibit fitness for the same in education, studiousness, laboriousness and morals. This done by those of us who believe in divesting ourselves of the stigma cast upon our calling by the impositions of incompetent and disqualified men, we will have recruited into our ranks men in sympathy with us. With their assistance it will be easier to teach the public to discriminate between the imposter and quack, and the truly qualified practitioner, and to create a popular demand for such legislation as shall prevent any man from commencing to practice in our ranks who shall not first give evidence of his qualification. This accomplished, remodel and consolidate the colleges. There are too many of them.

The secular press has taken up criticism upon the annual product of the doctor factories, selling parchments at so much per piece upon certain easily complied with conditions, and without reference to the previous training or occupation of the purchaser which may fit or unfit him for the responsibilities of a professional man, and we cannot deny that the argument has some strong points. The numbers in all professions, that is of the non-productive part of the population, are increasing, utterly out of all proportion to the increase in the general population, which is wrong in the light of political economy. This over-production of so-called professional men, results in only partial employment of them. Hence, we find *that* competition which not only gives decreased incomes to individuals, but also much poorer services to the public, in place of *that* competition which should strive for the highest degree of excellence in our services rendered to those who are compelled to call for them. The questionable practices that many feel compelled to resort to in consequence of this over-production, detracts from the position that we are struggling to reach: A body recognized as a profession by the public and learned professions, and not merely,

as now is too often done, as a body of tooth carpenters; as men who dig out holes in teeth and plug them up again for so much apiece.

But how can this over-production be checked? As our colleges are now organized, this unlimited increase beyond the demand will continue, even should the States legislate that no man shall commence the practice of dentistry without a diploma. Colleges should be organized under the sponsorship of endowed institutions of learning, capable of paying living salaries to competent professors. In places where there are two or three colleges, the best interests of the profession demand that they be consolidated into one upon this basis. The best talent of the several institutions should be concentrated in the one. Such a college, not being dependent on its matriculation and diploma fees for its running expenses, will be delivered from the temptation of taking all comers, irrespective of their fitness, and will only graduate such men as really are deserving, and who will confer honor and esteem upon our calling. The rivalry between colleges then, will not be which can turn out the largest number of graduates in the shortest length of time, but to see whose alumni will shed the greatest luster upon the calling for which it has thoroughly prepared them. It does seem a waste of energy and time to keep alive colleges whose corps of professors largely exceeds the class of students in number, and the sooner such institutions go into voluntary exile from the field of education, the better it will be for the teachers as well as students. It is not desired to find fault altogether; we all must admit the great work — poorly organized as they are — our colleges have done, but the profession all along the line calls for an advance, and as reform has been the watchword in the political world, let us take up the refrain and press ever onward, until that consummation devoutly to be wished, is reached, and the children that come after us shall be better prepared for the combat with the destroying elements of the teeth than were their fathers, and call us blessed.

DISCUSSION.

Dr. Sturgiss, Quincy: Believed more in works than in faith; like the old preacher who would not change his creed, and who said if there were no hell he had lost fifty years of preaching; he would say that if gold is not the best material for filling teeth he has been twenty-six years misrepresenting by his practice. Was in favor of all new

improvements upon the old methods, but this idea of discarding gold altogether was foolish. Has used other materials where gold could not be used. Finds teeth that will not bear filling with gold, but which can be filled with some other material.

Dr. Black, Jacksonville: There is one difficulty about our discussion of this paper. Every one believes that the paper told the truth. Would like to hear those who are opposed to the views of the paper.

Dr. Cushing, Chicago: In investigating the claims to attention which these notions have upon us, our first duty is to ascertain the character of the witnesses in the matter of reliability. When men claim to give us facts, it is proper that we look for evidence of their credibility as witnesses in the case under consideration. The opinions quoted in the paper should carry no weight with them, unless corroborated by thoroughly reliable witnesses. Most of the older members of the Society know something of the gentleman whom the paper criticized, and they know that his rashness of statement unfits him as a witness in this matter. Many of the members can doubtless recall an incident which occurred at Cincinnati, about twelve years ago, when he stated how quickly he could fill a tooth with Morgan's plastic gold. He claimed to be able to do it in two minutes, and did complete his operation in a very short time, but some one, immediately after its completion, thrust a large, blunt pointed instrument entirely through the filling, demonstrating its worthlessness. With reference to the opinions of another gentleman, who has been more prominent and pronounced in his advocacy of these doctrines than any other, it will perhaps be remembered by most of you, that he stated in the *Missouri Journal* for April, 1876: "We do not know of such a preparation" (of gutta percha that can be made *water tight* in a tooth or glass tube) "at present." But the speaker had with him several test tubes which had been filled with Hill's Stopping by two different persons, in which the fillings do not leak. It must be remembered that it is possible for gentlemen to misstate facts (though not intentionally) in cases like these, simply because they do not know how to successfully manipulate certain materials. Stated these facts because they go a great ways toward invalidating the testimony of those gentlemen on all their statements of fact. What the new theories advanced by these gentlemen may be worth, he could not say, but they should be accepted with great

caution, and not until something definite had been proven in their favor, which up to the present time their advocates have failed in doing.

Dr. K. B. Davis: We all know in our courts of law it is the practice to impeach an interested witness. We are also aware that some of the most prominent advocates of this new departure are interested in the manufacture and sale of amalgams, and it is possible that these facts influence their testimony in relation to this new departure. Objects to nothing in the President's paper, and cannot discuss it at all.

DENTAL NEURALGIA.

By G. V. Black, Jacksonville.

Before proceeding to discuss that form of neuralgia which we designate as Dental Neuralgia, it will be well to briefly consider

NEURALGIA IN GENERAL.

Neuralgia is a term used to designate an affection characterized by pain, located in the trunks or branches of the sensory nerves, and unaccompanied by other symptoms. But little is known of its real nature. Post mortem examinations have usually revealed no organic lesion of the nerves involved; the changes, if any, not being of such a nature as to be demonstrable by our present means of examination. There can, however, be but little doubt that in the production of pain there is a molecular excitement, at least in the elements of the nerve itself, that differs essentially from that called into play by the conduction of impressions in the ordinary healthful way. The healthy conduction of impressions, of course, includes pain as well as tactile impressions. The pain from a wound, or a simple inflammation of a sensitive part—as the tooth-pulp—is conducted to the sensorium in a perfectly healthy way by healthy nerves.

Some forms of neuralgia seem to consist of such a condition of the nerves, that the effort to convey sensation—perform their function—is painful, as the performance of the function of contraction

is painful in an inflamed muscle. Other forms of the affection differ from this in that the nerves seem to convey normal sensation properly, and without excitation of pain. It is evident that the nerves are not only the seat of pain, but the seat of disease in many instances.

Neuralgia may be either primary or secondary, but is, perhaps, very generally secondary, and dependent upon some preceding or co-existant disease or lesion, and, therefore, symptomatic. No division into primary and secondary can be of any value, unless it can be shown that certain symptoms, or classes of symptoms, arise from definite causes, and thus afford a guide to treatment. It is probably best, with our present knowledge of the affection, to always consider it as dependent upon some pre-existant or co-existant malady. This malady or lesion may be of the most obscure character possible, and wholly escape our closest search; indeed,we may say that in a large proportion of cases no cause can be discovered.

The *Pain* in neuralgia is entirely peculiar to this affection, is essentially different in its character and course from that induced by other causes. We may have pain projected from the seat of an injury or inflammation, either in a centric or excentric direction, and yet not constitute neuralgia. We may often find pain projected along the arm, in case of whitlow. The entire arm may become painful; the elbow or the axilla may suffer from projected or sympathetic pain. These sympathetic pains occur from various causes, but are almost always accompanied by intense suffering at the seat of lesion. Certain affections of the teeth, as pericementitis, are liable to cause them about the angle of the jaws, throat, &c. The lymphatics are usually involved, and the glands become swollen.

Neuralgic pain is essentially different from these projected pains and seems to have nothing in common with them. The pain is never steady, but presents well marked intermissions or remissions and exacerbations; it is paroxysmal, the paroxysms follow each other in rapid succession, or the intervals may be much extended, even to days, presenting the utmost irregularity. It is usually a sharp, piercing pain, shooting along the course of the nerve, often with lightning-like speed, but sometimes changing its locality slowly, or possibly remaining stationary for a short time in one spot, or skipping about from point to point. We have seen patients endeavoring to point out the immediate seat of pain, place the finger on the chin, under the eye, the angle of the jaw, the ear, the temple, &c., in rapid succession, and declare that the pain ceased in the first locality and appeared in

the second, and so on, only one point being painful at the same moment. Again, we have seen the course of the nerves accurately traced in following the pain, as it darted from point to point. Again, the pain may become at once intense along the course, or the portion of a course of a nerve trunk, and remain so for an indefinite time when it will remit or wholly intermit to be renewed after an indefinite time in exactly the same locality. The pain is usually described as sharp, lancinating, piercing, boring, tearing, burning, and the like. Very rarely do we hear patients complain of heavy, dull pain, except in the remission of the paroxysms.

The pain may be seated in the skin, and, therefore, superficial.—In this case it is oftenest described as prickling, as though a thousand needles were pricking the flesh. Sometimes this is burning, as though each individual needle was red hot. The slightest causes are often sufficient to induce a paroxysm, as a breath of cold air, the hand passed over the part, or anything that may call upon the affected nerves to convey an impression—exercise their functions—which gives a striking resemblance to the pain induced by the contraction of an inflamed muscle. In other cases the paroxysms come and go without any apparent cause.

There is usually no special attendant constitutional symptom farther than general debility as a result of continued suffering. The disease may, however, and as a fact, is often developed in connection with other diseases, especially such as slowly impair the vital powers, scirrhus, etc.

In many cases, certain painful or tender spots make their appearance along the trunk of the nerve, or at the situation of the ganglia, which are found to be tender on pressure. These tender spots may or may not be the seat of pain. Our personal observation, however, is that they are found to be points from which the pain radiates in the beginning of paroxysms. They are often of diagnostic importance.

Local Anæsthesia is frequent result of neuralgia; the nerves seeming to lose, temporarily, the power of conducting impressions. This is perhaps noticed oftenest when the pain affects the surface. In several instances we have seen these anæsthetic spots well marked about the face. We examined a case, recently, in which sensation was entirely lost in the region supplied by the nerves escaping from the mental foramen. Pulps of teeth which cause neuralgia are often found in a state of anæsthesia.

ETIOLOGY.

The causes of neuralgia may be divided into Predisposing and Exciting. Those who may be predisposed to the affection may have it developed by a very trifling exciting cause, while those who are not so predisposed, such causes may fail entirely to develop the affection.

PREDISPOSING CAUSES.

The Neuropathic predisposition, which has been minutely studied and established in late years, plays a very important part in the causation of many nervous diseases. By this phrase, says Dr. Erb:* "is understood a pathological constitution affecting the functional constitution of the nervous system, by virtue of which, those who are thus constituted manifest throughout life the most varied pathological symptoms in regard to sensory, motor and physical processes. No one has yet been able to show in what this peculiar anomaly consists, and while some console themselves with the hypothesis of delicate trophic disturbances, or modifications of molecular arrangement, without thereby getting any nearer the facts, we must rest satisfied that such constitutional Neuropathies really exist, and that they play an important part in the production of neuralgia. They may be congenital, or acquired in consequence of various adverse influences. Many forms of neuralgia owe their origin to transmission from parent to offspring, which seems also true of many other nervous diseases, as chorea, hysteria, paralysis, etc."

Certain periods of life also have an influence in predisposing to neuralgia. It does not occur often in childhood, it seems to increase with increasing age. The sexual periods, as puberty, the menopausis, etc., seem also to exert an influence on the nervous system favorable to the development of the affection. Disturbances of nutrition also predispose to it. There is, perhaps, no more fruitful cause than anæmia, under the influence of which many distressing cases are developed.

All influences which tend slowly to depress the vital powers, such as over-work, too little sleep, close application to study, to the needle in sewing women, confinement in illy ventilated rooms, etc., favor the development of the affection.

*Ziemsseu's Encyclopædia.

EXCITING CAUSES.

The most prominent exciting causes of neuralgia are wounds, mechanical irritants, punctures, contusions, etc. The severest forms of neuralgia have occurred from these when they have affected the nerves directly, even when they have affected only a small branch of a sensory nerve. Irritants applied to a nerve, as a bit of glass, a brier, an exposed tooth-pulp, etc., have been demonstrated to have been the exciting cause of wide-spread neuralgia, not confined to the injured nerve, or its trunk, but radiating to many others besides.

Many cases of neuralgia are also supposed to be due to some changes in the bony orifices through which they pass from their origin to their distribution—to little ossific nodules or exostosis impinging upon the nerve trunks.

Malaria is also a very frequent cause of the affection, giving rise to many very severe forms of the disease. It may act as a predisposing cause in connection with mechanical irritants, or as an exciting cause in connection with other predisposing causes. Very many exciting causes might be noted, but space forbids. Enough has been mentioned to illustrate tendencies from which judgments may be formed in special instances.

COURSE OF THE AFFECTION.

How certain conditions predispose to neuralgia is unknown. It is equally unknown as to how exciting causes act to develop the affection. Yet inquiry as to the observed cause of observable phenomena will not be wholly unprofitable.

It is not common for the pain to be developed suddenly, as may be the case with pain from an injury. An uncertain period of time is required for its development, during which slight pains may be felt in the part about to be attacked, which gradually increase in severity. A period of preparation or development seems to be an essential feature of the affection. This is true, no matter what the exciting cause may be. A brier lodged in the flesh with its point in a nerve branch will produce a pain of a normal kind immediately upon its lodgment, but no sudden neuralgia. A neuralgia may be developed within a few days or a few weeks from the continued presence of the brier point. This is something essentially different from the normal pain accruing immediately upon its lodgment or the inflammation its presence may have excited.

We have, therefore, a development of conditions in the sensory nerves themselves, that induces and is necessary to the production of the pain in question. As before remarked, we may call this by this name or that, without arriving at any better understanding of the subject. It seems certain, however, that some nerve change is induced that gives rise to abnormal nerve function, the essential feature of which is pain, we may, therefore, designate this as the neuralgic condition of the nerves. This condition may be developed in and effect only a single branch of a sensory nerve, or it may at once be developed in all the branches of a common nerve trunk, or in a given region, or simultaneously in a large portion of the body. It may also first be enveloped in a single branch, or two or more branches, and then pass successively to other branches of a common nerve trunk, and then, as if by radiation from nerve center eccentrically, make its appearance in other nerve trunks in the neighborhood, and occasionally in distant regions of the body. In many instances there would seem to be little room for doubt that the spread of the affection is by propagation of the neuralgic condition along the branches and trunks of the nerves in a direction from periphery to center, and the reverse. As a rule the affection does not present a continuous progression, but after making more or less advance, becomes stationary, frequently only extending to certain trunks and its branches, or the pain may be confined to the trunk or certain portions of the trunk of the nerve. In that case the pain does not appear superficially but darts along, or is stationary, in the course of the affected portion of the nerve, as is often the case in sciatica.

The duration of the affection is exceedingly indefinite. It may continue for a lifetime, in spite of the most skillful treatment, or it may disappear within a few days. Generally, if a direct exciting cause is found and removed, the affection disappears in a very short time, if not immediately.

DENTAL NEURALGIA.

Under the term Dental Neuralgia, we include those cases of neuralgia the direct exciting causes of which are to be found in affections of the teeth. There is no longer any doubt that neuralgia of the fifth pair frequently has its origin in diseased conditions of the teeth as the direct, exciting cause. It therefore only remains for us to point out those conditions under which this result is most likely to occur, and if possible to indicate those forms of the affection thus developed.

Of course any exciting cause of neuralgia is most liable to develope the affection in those constitutionally predisposed to it, or who have become temporarily so from any cause, as anæmia, miasma, overwork, etc. This being understood, we may proceed to discuss those conditions of the teeth tending to its development.

We should say in the beginning that neuralgia must not be confounded with those cases of toothache in which sympathetic pain is projected to more or less distance from the seat of lesion, thus causing confusion in the patient's mind as to the particular tooth which causes the trouble. These we regard as cases of confusion of the sensorium in referring the pain accurately to its proper location, so that pain in a lower molar is referred to an upper, or the reverse. Again, pain in a molar may be referred to several of the adjoining teeth, as if neighboring nerve filaments had come to the aid of, and had taken upon themselves a portion of the burden of their fellow who was struggling under a load too heavy to be borne. In these cases the pain, although it may radiate to different parts of the face, is referred to the teeth as the part subjected to injury, and does not, necessarily, involve a neuralgic affection of the nerves, and usually differs essentially in its character from that affection.

At the same time we must not forget that neuralgia from causes entirely occult referred to the distribution of the fifth pair, may be felt especially in the teeth, while these organs may, in themselves, be in a perfectly healthy condition. The extraction of teeth, under such circumstances, would afford no relief, farther than temporary abatement of pain from the shock of the operation.

Miss T., a teacher, applied to me February, 1872, on account of neuralgia, of which she said the central point of pain was the right superior molar. In tracing the course of the radiation of the pain, she traced the second division of the fifth pair, and that only. The molar tooth, and a point below the orbit—deep seated—were the especial points of pain. We noticed that in pointing out the course and seat of pain, she avoided touching the face. On brushing our fingers lightly across the face, a paroxysm of pain at once occurred.

Here were two points that very clearly contra-indicated a dental origin of the affection: 1st, It had been in progress for six weeks, and only the second division of the fifth pair was involved. In every case of demonstrated dental neuralgia we have seen, the second and third divisions have been at once or very quickly involved. 2d. The act of

conduction of sensation from the surface induced a paroxysm, which we have never seen in dental neuralgia.

The tooth in question had a very large gold filling in the grinding and mesial surfaces, which we had placed there four years before, after removing the pulp. It showed no sign, whatever, of pericemental disease. The patient was evidently suffering from overwork and anæmia. We advised rest and a tonic course of treatment, both of which were practically disregarded. The patient was anxious to have the tooth out, which we refused, fully believing it would be of no benefit. The case grew rapidly worse, and extended over a considerable part of the body, becoming bilateral. She was forced to leave her duties, and resolved to have the tooth out. She applied to another operator and had it removed. The case continued to grow worse. After exhausting her physician, she was advised, as she afterwards expressed it to me, "to go to the mountains and go wild in the woods," which she said she accomplished to the letter in a double sense; wild with pain and wild in the mountains. After two years of suffering, she slowly improved and was restored to her former health.

Dental Neuralgia we believe to arise from, and to be symptomatic of certain lesions of the dental pulp. So far as we have personally observed, it makes its appearance first in the fifth pair, and uniformly affects some portion of both the second and third divisions. From these it may extend to the first division, to the nerves of the neck and chest, and to the brachial plexus and upper arm. It seems never to appear superficially on the skin, but is always deep-seated, seemingly confined to the nerve trunks and principal branches—otherwise it does not differ especially from neuralgia of the fifth pair from other causes.

The affection is never developed directly from acute inflammation of the tooth-pulp. In this condition pain may be radiated to neighboring parts, the same as sympathetic pains may arise in the neighborhood of other inflammations. How much this may have to do with the final development of neuralgia in those predisposed to it, is uncertain. Our own observation is, that very few sharp, active inflammations of the tooth-pulp degenerate into neuralgia, yet we have seen examples where this seems to have been the case. In all such, the inflammation has first become chronic and the local pain mostly or entirely abated before the occurrence of prominent neuralgic symptoms. As a rule, hyperæsthesia of the pulp precedes the occurrence of the affection, and it has generally been noticed by the patient that a certain

tooth has been sensitive to thermal changes sometime previous to the attack, and perhaps for a time after the development of the affection. This usually gives way, gradually, to an anæsthetic condition of the pulp. In very many cases we have examined, however, no such previous or accompanying hyperæsthesia could be discovered, the patient being positive that there had been no abnormal sensitiveness of the teeth. In such cases it is rare to find the offending tooth in the front, or an exposed part of the mouth. A common situation in such instances in which to find the exciting cause is in a second molar or wisdom tooth, with a buccal decay about the margins of the gums, with a fungous growth of gum growing into and filling the cavity of decay, very efffectually protecting the exposed pulp from external influences. From these circumstances, we are convinced that hyperæsthesia of the pulp is always a forerunner of neuralgia, but it is not necessarily great, and may often escape the notice of the patient, provided the cavity be occluded and in the posterior of the mouth. By far the larger portion of dental neuralgia arises from exposure of the pulp in protected situations, where it remains uninjured by foreign bodies, and vitiated secretions are retained in contact with it. It seems likely that this circumstance is in part necessary to the changes which must occur in the pulp as a step in the initiation of that nerve change which must begin at this point and proceed thence along the branches and trunks of the nerves, in order to the development of the affection. Such teeth are not usually sore to the touch, nor to rapping with an instrument. This may, in some instances, excite a paroxysm of neuralgia, but our observation induces us to believe this is rare. Therefore, we consider this test, so much relied on by physicians, and so often reported in medical writings, as wholly unreliable in proving or disproving the dental origin of the affection.

After a few days' existence of neuralgia, if such a pulp be touched with an instrument it will be found sensitive, perhaps abnormally so, and a paroxysm of pain will generally follow the experiment. But if the neuralgia has been in existence for several weeks and has been severe, the pulp may be found in a state of complete anæsthesia, yet a neuralgic paroxysm is likely to follow within a few minutes after a puncture. How long a pulp may remain in this condition and yet retain its vitality, is unknown, and is probably very indefinite. We have seen several cases in which it had existed three months, and one in which we have reason to believe it had existed more than six months,

during all of which time the paroxysm had been frequent and very severe. We will relate the case:

April 20th, 1871, Mrs. L. N., aged about thirty, married, applied for removal of second right superior bicuspid, which was very much decayed, being directed by her physician to have it out, on account of neuralgia. She gave the following history: About six months ago she had some difficulty with her teeth, and as the molars and first bicuspid on this side were badly decayed, she had them removed. The second bicuspid was also much decayed, but she intended to have it filled, but had neglected it. She had had no more trouble with her teeth, but continued to have occasional paroxysms of neuralgia, in both upper and lower jaw, which increased in frequency and severity, and gradually extended to temple and brow, and to the orbit; and also had severe ear-ache. Within about six weeks the pain extended down the side of the neck, and finally to the chest, afterwards to the upper arm. It had been so severe in this position that she could not use her arm well. She had had no superficial pain at any time; no prickling or loss of sensation, in the skin. The patient was very pale; decidedly anæmic, and seemed in a very weak condition of body. Stated that her health had been good before, though she was not robust.

Examination of the bicuspid tooth showed a large decay in mesial surface, pulp dead, peridental membrane healthy. A decay was discovered in the cuspid, mesial surface, with opening into pulp, which seemed insensible, but bled on being touched with the excavator.

We proposed the removal of this pulp, to which patient objected, saying she had been sent to have the bicuspid removed. This we refused, and referred her back to her physician, with statement of the result of our examination. 21st. Patient returned. While opening the pulp chamber for removal of pulp, a very severe paroxysm of pain occurred throughout the affected parts. Arsenic was applied. 23d. Reported very severe suffering for several hours after application. 24th. Better, but objected to having pulp removed, feared another paroxysm. As there was no signs of soreness, it was deferred until next day. 25th. Removed pulp without exciting pain. No paroxysm had occurred for twenty-four hours. Patient rapidly recovered her usual health.

In another case: a woman aged about twenty-five, unmarried, a seamstress, before in apparent good health, came to me with neuralgia that had proved intractible for three months. The history of the case

showed the affection to have made its appearance in the third division of the fifth pair, pain quickly involving the second, and more gradually spreading to other nerves, until the branches of the fifth, the side of the neck and chest were involved, but not the arm. There was in this case considerable mammary pain, which, however, had been the last locality in which pain had been developed.

The cause of the difficulty was found in a lower molar, the pulp of which I had capped with oxychloride of zinc and filled some weeks before the occurrence of the neuralgia. The pulp was at once removed by the broach. In itself it did not seem sensitive, but a severe paroxysm of neuralgia followed. Within a week the paroxysm disappeared, but the anæmic headache, a severe pain in the top of the head, persisted.

We saw the patient no more, but learned that malposition of the womb occurred during this anæmic state, and chronic metritis was developed, from which the patient made a tedious and imperfect recovery.

These cases will usually, if the neuralgic predisposition be not very decided, be relieved by the destruction of the irritated tooth-pulp, or removal of the tooth, without other treatment. Spontaneous death of the pulp is attended with a like result.

The cases we have recited have been the worst forms we have met with. Cases of such duration, we are persuaded, are not very common, nor is there any necessity for their duration, if the cause be recognized. Most of the cases we have met with, have been of only short duration. That some of these would have been as bad as those related, if the cause had not been recognized, we have every reason to believe.

PATHOLOGICAL CONDITION OF PULP.

In these cases the condition of the pulp, as before remarked, is never that of active inflammation. In the cases where we have minutely examined the pulp we should explain it, first, as a destructive hyperæmia; there is an abnormal amount of blood without, as a rule, much hyperæsthesia, and second, what is of importance as showing the tendency of this diseased action, the dentinal fibrils have lost their sensibility, as shown by the entire absence of sensibility in cutting into the dentine. We have examined no well-marked case of neuralgia from the tooth-pulp where this was not the case. Third, there is often found a marked disposition to destructive ulceration of the pulp. The exposed surface in this case is usually covered with pus; this con-

dition, as is the case with most others recited, may often be met with where there is no neuralgia. Fourth, minute abscesses or pockets of pus are frequently found within the substance of the pulp. We have frequently discharged a minute drop of pure pus from a pulp and in a few instances have repeated this several times at intervals of a few days. Fifth, the pulp may be a little reddened, a natural color, or even ashy in appearance, not giving much evidence of disease by ordinary examination. When we have been able to remove and make microscopical examination at once, the tissues have been literally packed with wandering cells or leucocites. The number of these cells that may be present in the tissue without appearing distinctly as pus has greatly surprised me, and leads to the inference that this is essentially the condition of the pulp in all these cases of which the phases before described are modifications. How this may be we are not prepared to state, as this is a matter of recent observation. In two instances we have been able for a few minutes to see distinctly the motions of these cells as they crept, amœba like, through the tissues. This is a matter of great interest to both the Pathologist and the Microscopist, and we hope others will make observations. It seems likely that there is a tissue condition in which it becomes crowded with wandering cells to the extent, perhaps, of considerable swelling, without, or almost without, the other phenomena of inflammation.

PERICEMENTUM.

Our observation leads us to believe that neuralgia is never induced by pulpless teeth or pulpless roots. We are perfectly aware that many reports may be found in both dental and medical literature, that would seem averse to this opinion. But in closely scanning these reports we do not find that the conditions of such roots have been reported with such accuracy as would be necessary to establish that the neuralgia was a result of pericemental irritation.

Most of them are absolutely silent as to any definite examination that would determine whether or not a living pulp was present, and are, therefore, worthless so far as this point is concerned. We have never yet seen a case of neuralgia that could clearly be referred to, or was relieved by the removal of, pulpless roots or pulpless teeth. We have, however, met with a case that would doubtless have been so considered, if the examination had been less rigid. This was a first inferior molar—crown gone and an abscess at the anterior root

discharging upon the gum. The broach revealed a living pulp in the posterior root, which bled freely, and the puncture of which was followed by a paroxysm of pain.

As to why peridental inflammation should fail to induce neuralgia while such symptoms are induced by pulpal irritations, we have no theory to offer. This opinion rests entirely upon observed facts. This class of irritations begets another class of phenomena, which we may call projected sensations, or, sympathetic pain, in various regions, which are always co-existant with pain at the seat of disease. They are usually accompanied by disturbances of the lymphatics, and the glands are often swollen and painful, which is rarely an accompaniment of pulpalgia or neuralgia.

CALCIFIC NODULES.

What the influence of calcific nodules in the pulps may be in exciting neuralgia is difficult to determine. Our own observation would be against the production of neuralgia from this cause. But that the sharp corners thus formed may serve to perpetuate irritations aroused by other causes scarcely admits of a doubt.

EXOSTOSIS.

Exostosis of the roots of the teeth, or more properly, hypertrophy of the cementum, is undoubtedly an occasional cause of neuralgia of the fifth pair, but we are persuaded that it is of rare occurrence; we have never met with but one case that could clearly be referred to this cause. This we had under observation more or less closely for more than a year. The pain was felt mostly in the lower jaw, but the ear, a location deep-seated under the eye, and the malar prominence were often referred to as painful. Before the case came under our observation, most of the teeth on that side in the lower jaw had been removed in the vain attempt to cure the trouble, but without effect. We finally suspected a superior molar that had protruded from loss of its antagonist; upon removing it the roots were found largely exostosed—tooth otherwise healthy. Complete and permanent cessation of the neuralgia, within a week, which had been of five years' duration, justifies the opinion that the exostosis was the cause.

Quite a number of reports of neuralgia from this cause are found in our literature. We know of no distinctive feature that can serve us in arriving at a diagnosis.

ALVEOLAR ABSCESS.

Neuralgia from the burrowing of an alveolar abscess into the inferior dental foramen is an occasional occurrence. This is generally met with in the chronic form of abscess and, in the two cases coming under observation, the region supplied by the nerves escaping from the mental foramen and the anterior teeth have been the seat of pain. In such cases the presence of a tumor or a fistulous opening on the face, or more generally beneath the maxilla, will point unerringly to the source of the mischief. One of our cases was rather interesting. Mr. Geo. A. applied to me with neuralgia of the chin and lip on the right side, which had recently appeared also in the anterior teeth.—Patient stated that it had troubled him more or less for eight or nine years but he was frequently free from it for several months at a time. The paroxysms were sometimes severe, but on the whole it would not be considered a severe case. Examination of the mouth revealed a row of perfect teeth upon the lower jaw of this side, except that the first molar was gone. The gums, at the point where it was removed, appeared healthy. A partially cicatrized fistula was found under the maxilla, about midway between the mental foramen and the angle. A probe started into this was carried forward and upward directly through the bone until it almost reached the gum where the tooth had been removed. The gums were dissected away and the bone cut into with a chisel—it was but a shell—disclosing a cavity in which was found a root of the missing molar, and some fragments of necrosed bone.

We should have stated that the missing molar had been removed eight years before for the cure of this fistula which, having failed, other means also failing, the condition had become to be considered by the patient as incurable.

Crowding of Teeth, and impacted teeth, may possibly cause neuralgia by causing compression of the dental nerves in their bony canals. We know of no means of recognizing a cause of this nature. Examinations of each individual case must be conducted by the judgment of the operator and the relations of the teeth studied. The probable position of impacted teeth made out as nearly as practicable, in order that their influence may be estimated. We are unable to give any estimate as to the frequency that these have been demonstrated to have been the cause of neuralgia. The cases that have already found their way into our literature have generally been too indefinitely re-

ported to serve as a basis for conclusions. We have never seen a case that we could clearly attribute to impacted teeth, and but few where crowding of the teeth seemed to act as a cause, and these were not very clearly made out.

DISCUSSION.

Dr. Crouse: The main point the essayist makes is that in all cases of neuralgia in the mouth, the pulp is in a state of anæsthesia—devoid of sensibility—that, he says, you get a paroxysm of pain directly when you touch the pulp. I want to ask Dr. Black how far into the substance of the pulp he passes his broach before getting this paroxysm of pain, and why he terms it in a state of anæsthesia. We have all seen pulps that are partially void of sensibility, from long exposure or other causes, but I should call them in a state of death, or so nearly dead as not to be able to give off acute sensibility. Do such pulps come to life again, or can they be restored to a condition where they produce acute sensation? I have never seen such a pulp restored to health. In the cases where, on removal of the pulp, he got a paroxysm of pain, and there is no further recurrence of it, I should say the pain was caused by the breaking off of the connection of the dead pulp from where it was alive. The gases from the dead portions of the pulp many times cause the neuralgia. If he admits that pulps which are partially devoid of sensation are in a dying condition, I take exception to his calling them in a state of anæsthesia. I understood him to say he had never seen a case of neuralgia where the pulp was gone, yet cites cases of abscess where he had complete nuuralgia. I have hunted all over the mouth for neuralgia, and have by and by found a little root in which there was not a sign of pulp, that caused all the trouble. It is my opinion that we may have neuralgia from a dead root. He speaks of removing drops of perfectly formed pus from the substance of the pulp. I think that he has not, in such a case, a very healthy pulp. Perhaps the pulp in one root was dead, and the pus may have come from it. I would like to inquire if the pulp was otherwise healthy.

One very positive cause of neuralgia is ossification of the pulp, the ossific matter impinging on the nerve in the pulp cavity.

I have had two or three cases where nothing but extraction of the teeth effected a cure, and have always found exostosis of the root in connection with calcification of the pulp.

I had a case recently where the patient suffered for years, and on removing the upper teeth all the roots were largely oxostosed. There has been no more trouble with neuralgia.

Dr. Townsend, Pontiac: Had a very severe case of neuralgia, three years ago, which continued for several years. The lower teeth were badly decayed. Removed five or six of them, and obtained complete relief. Also had another case in which he removed two sound teeth and one other. He split the teeth open and found calcific nodules in all of them. The patient had suffered severely, but was entirely relieved by the operation.

Dr. Brophy: There is one more cause of neuralgia which the paper did not mention, viz.: imbedded teeth. The severest case ever seen by the speaker resulted from that cause.

The patient, with severe pain located upon the left side of the face, called upon a surgeon for treatment, who said it was a tumor and advised its removal. An operation was commenced, and discontinued, the surgeon believing it was something he did not understand, he sent the patient East. The patient was there under the care of an eminent surgeon, who opened the antrum, but failed to give relief. He prescribed quinine and iron. Finally she called upon a surgeon in Chicago who pronounced it imbedded teeth. At twenty years of age she had had all her teeth removed, and remembered that two teeth were then absent. The surgeon explored, operated and removed a bicuspid tooth. About three months afterward the pain returned on the other side, and another tooth was removed. The teeth were perfect. Speaks of this because it is a common cause when the tooth is absent, and if any serious trouble arises it is well to suspect something of that kind.

Teeth, the canals of which contain pulp nodules, sometimes become slightly elongated and very sensitive to the touch and quick changes of temperature, so that this is another means of diagnosis.

There is another cause of neuralgia, which is spiculæ of bone, which sometimes remain a long time after extraction of teeth, and cause pain, but they are easily discovered.

Dr Black: Wanted to say a word about anæsthesia of the pulp. Supposed the gentleman was not in earnest when he said the paper was describing a healthy pulp,—it was speaking of pathological con-

ditions. Among those who make treatment of neuralgia a business, anæsthesia is one of the symptoms. He saw a case only a month ago in which there were a dozen places on the body of the patient entirely insensible. These things are common in severe cases of neuralgia. These pulps are not devitalized. They are in the process of destruction, but are not dead. They are in such a condition that the nerves cannot conduct sensibility in the normal way.

Question. Can you detect any pulsation in these pulps?

Dr. Black: Hardly ever. Now, about that little drop of pus: He takes a delicate instrument and pricks a pulp, and something oozes out, which he finds by microscopic examination to be pus. He did this five different times with one pulp, and then destroyed it with arsenic. He did not attempt to give these cases other treatment than removal of cause.

Dr. Talbot: Filled a wisdom tooth for a lady three years ago, and found an exposed pulp, which he capped, and filled with amalgam. The first of February she came to him with a fearful neuralgia in the right side of the face; he removed the filling and found the pulp perfectly healthy. He did not see her again until a week ago, and she had suffered all the time. An abscess had formed at the apex of the canine, the root of which had been previously filled, and was about three months in formation. This is a clear case of neuralgia from a pulpless tooth. There is another point. Where a tooth has been aching for two or three days, he always makes an application of creosote or chloroform to reduce the inflammation, and then have the patient return and make the application of arsenic.

Dr. J. A. W. Davis: Asked if nodules are invariably the cause of pain, and what are their symptoms?

Dr. Crouse: We cannot diagnose them easily. There are no very distinct symptoms. Teeth with nodules in pulps are sensitive to heat and cold; generally some periostitis accompanies these cases. The pain is sharp, but not so severe as acute toothache from an exposed pulp. Must conclude we have calcification of pulp if the symptoms and examinations fail to make it any other trouble, or when we have looked for every other form of disease and do not find any. By drilling into the pulp we can find out how correct our diagnosis is.

Dr. Townsend: Had a case some years ago of very severe neuralgia in the lower jaw. He concluded it was calcification, and drilled into the tooth and found the pulp was entirely calcified.

Dr. Brophy: Removed several roots not long ago, and found some enlarged spots near the apex of each of them. There were no pulps, and patient suffered intensely from neuralgia. There was no doubt that this was neuralgia resulting from pulpless roots. Has removed many nodules in canals, and relieved the pain.

Dr. Black: Their being pulpless is an accident of the case. You perhaps have read Dr.——case of neuralgia; he removed tooth after tooth, and then the patient suffered from the pressure of the plate. We must be careful or we will extract teeth in vain. Have seen mouths where teeth have been removed from neuralgia without curing it.

Dr. J. A. W. Davis: Has a patient for whom he has extracted nine teeth for neuralgia. She is sixty-nine years old, and now she still has pain just as severe as before.

ARE WE PROGRESSING?

By J. F. Marriner, Ottawa.

It may appear to many, that this is a singular subject for this day and age, when progress is claimed in everything, everywhere. There is probably no branch of business in our land, whose progress has not far exceeded the expectation of all who were at its commencement engaged in it. Of this there is no doubt. And now the question arises, are *we* progressing? I believe we are—even if I fail to make it appear. As fillers of teeth—manipulators of gold—none I think will have the hardihood to say we have not made progress.

As it appears to me, no one who has an eye for natural beauty, and that eye educated in art, but will at once see and acknowledge superior taste and skill in fillings made now compared with those of twenty years ago, for many of the fillings of to-day are in make and finish, truly works of art; they are like a cabinet of jewels and precious stones, but are not only to be looked at and admired, but used and worn as well.

Much criticism has of late been made upon gold as a material for filling teeth, other materials as Tin-foil, Hill's Stopping, and Amalgam have been suggested. The amount of benefit arising from such criti-

cism is not easy to determine, but that its tendency is in the direction of progress, I have little if any doubt, as it has been the cause of much thought and careful observation as to the merits of amalgam, as well as of other materials while in active service in the mouth; which to my mind is far more reliable, than all the experiments that ever have, or ever will be made, out of the mouth.

It has been said (and by men of whom we should expect better things), that we are not progressing; worse even than that—that we are destroying more teeth than we are saving. If this be true it is indeed a sad commentary upon the manner in which we perform our operations, and a slander upon the intelligence of those for whom we work.

I have been told that the profession was not as successful in saving teeth as it was years ago. Can this be true? Knowledge has been greatly increased in the last few years; we know more of Anatomy and Physiology; more of the Principles and Practice of Surgery; more of Pathology and Therapeutics. In fact, we are learning something almost every day that is new and valuable. Under these favorable circumstances can it be that we are not progressing? Is it possible that we should live at such a time, with so much light and stand still? We are either advancing or going back, as nothing ever does or can stand still. If we are not progressing, something must be wrong. Is our integrity at stake? If so, let us see to it and correct it; and work, hard as did the ancient Painter, for eternity. It is grand to be a great, and earnest worker. Even nations are virtuous and free, in proportion as they know how to work. This little word *work* is the "key note" to all progress. And being a profession composed of workers it is not only consistent, but it is in perfect harmony with the laws of nature that we should progress; it is *inevitable*, and as sure to follow as the rose to unfold its loveliness to the morning sun.

It is not many years since we, or a great many of us, were working under disadvantages while making a gold filling, that were at least trying, if not discouraging; having to use napkins, towels, saliva pumps, and every other device that ingenuity could bring to our aid; we worked with a look almost of despair, momentarily expecting inundation. Many of us look back to that time with feelings that can better be imagined than described.

But let us lay this picture aside, and look for a moment on another where we will see the operator of to-day, with his patient seated in a beautiful and easily adjustable chair, himself seated on his operating

stool, his assistant ever ready to attend to, and often anticipating his wants, his little square of "Elastic Profanity" placed carefully, and safely between himself and his enemy, saliva, with nothing to fear, and plenty of time to see and know just what he is doing.

I well remember a little more than a year ago, entering the office of one of our members and finding him answering the above description; he looked neither pale nor haggard, but stood like one divested of every earthly care, sweetly singing "I want to be an angel, and with the angels stand," and yet some say we are not progressing.

But this is not all; compare our practice now with that of fifteen years ago in the matter of capping pulps. Very few, I think, at that time boasted much of their success. If I remember right, I heard an operator say about that time (perhaps a little later), that the idea of saving a pulp alive, after exposure had taken place, was the most absurd thing he ever heard of. How is it to-day? If an operator does not make an effort to save alive a large proportion of the exposed pulps in his practice, expecting those efforts to be crowned with a reasonable amount of success, we think he is not quite up to the standard of practice. I claim progress here.

And now compare our practice with that of even ten years ago. At that time three-fourths of the work done by a large majority of dentists, was plate work, while to-day, judging from my own practice, and that of others with whom I am acquainted, seven-eighths is operative. And here, it seems to me, is progress not to be disputed. And again, look at the treatment of the oral cavity. We are treating (successfully too) diseases of the mouth almost every day, that formerly many of us were sending to the physician. In this we deserve much credit, as we have learned to do our own work, and are thereby saving our patients much annoyance. This is evident from the many expressions of gratitude we so often hear from them. And are we not coming in contact every year, more or less, with tumors of the mouth of which the physician knows little or nothing? Who is better qualified to diagnose, treat and remove these, if necessary, than the competent dentist? Does not this show advancement? Does it not *prove* that we are every year becoming more self-reliant, depending more and more upon our own resources? We have had, it is true, men to lead us whose whole soul was in the work, and much to stimulate us in the way of appliances, beautifully made and finished, while their adaptation is rapidly approaching perfection, and why? Because they are invented and made by men who know what they require.

The same may be said of our gold; it has been prepared in so many different styles, any of which is beautiful, that we can obtain it in any form we prefer. There are numerous other improvements that I have not time to mention, neither is it necessary, as they are, or should be known to all of us, and are to be found in every well-appointed dental office. There is, however, one thing more I wish to speak of, which is, as I view it, the grandest productive of the greatest amount of good, as well as the most beautiful step of any yet taken, by the dental profession. It consists of our liberality, our mode of disseminating knowledge. Through the liberality of a few whole-souled men, meetings like the present were originated, and from the day of their first inception until this, they have been growing and expanding till they have furnished to the dentist direct, more true and practical knowledge than any other institution under the sun. It has made us liberal here, and generous at home. How pleasant it is when opportunity presents, to visit at each other's offices, talk of our trials, and tell of our failures, and give, or receive, as the case may be, advice, encouragement and new ideas that are sure to help us in the future. We all know that this was not always the case with at least a majority of dentists. The history of dentists in this respect is similar to that of sash makers, at the time when the making of common window sash was a secret. When they were being manufactured, the shop door was always locked, and if you wished to enter, words to this effect would reach your ear from within: "Can't come in, making sash!" I say similar, because it is not so very long since, that if one dentist called on another and showed any desire to get a look into either "Laboratory or Operating Room" the owner was quite sure to be making *sash*, consequently the visitor was not expected, or allowed to enter. That has all (with right-minded men) passed away, and why? Because we are progressing, and have become more liberal and anxious for the welfare of our profession. Now dentists visit each other frequently, and if while together one finds that the other does not know how to make *sash*, he at once proceeds to initiate him into the mysteries, and by the time they separate, the visitor has learned not only *sash-making*, but many other things, that to all intents and purposes, had been as much of a secret. We are welcomed to the laboratory and operating room, where, in almost every instance, something new and of value is shown and explained to the visitor. All this is the direct outcome of dental Societies.

A gentleman of ability (when I say ability here, I mean just what I say), one whom we all delight to honor, said in one of his late reports: "When we have dental journals saying month after month that gold under certain conditions is the worst possible material with which to fill teeth, and proclaiming this as the truth beyond all question, is it not time to stop and ask if this be progress?" I answer *yes*, and that many are doing so, and learning beyond question, too, that it is true progress. Again, says the same writer: "We know that the use of gold, *i. e.*, the intelligent use of it, is sure to produce certain results; the same may be said of tin." Just what the results are, he did not tell us; but from my own observations, would take it to be, that gold placed properly in a certain class of teeth, will result in the preservation of those teeth; while placed in every respect as properly in another class of teeth, failure is quite sure to be the result; and here is where tin produces results quite as certain as did gold in the former; and the man who knows this, and is competent to promptly decide between the two classes of teeth, and has the conscience, coupled with the ability, to do in each case the right thing, I claim is progressing, and may as well be placed among those called successful.

For that class of teeth in which gold, as a rule, fails, I would urge a more general use of tin-foil. While it may be, and doubtless is, more work to use this than plastic fillings, the assurance it gives of greater success, more than compensates for the extra work. This I believe to be sound practice, for the reason that there are two classes of teeth, one for which *I believe*, gold is "King," while for the other it is *destruction*, swift and sure. And in coming to this conclusion, I feel that I have taken a step, if not a *stride* in the right direction; in short am progressing. I believe the dental profession has made greater progress (taking age and and resources into account) than any other profession. Compare the age and ability of the dental, with that of the medical profession, and to my mind the showing will be in favor of the dental. While we may not be as popular with the undertaker, we are doing as much for suffering humanity, despite their age. When speaking of the dental profession, I wish to be undersood to mean men of ability, conscientious men who are looking for, and expecting results from their operations that will do them honor, and thereby *elevate* the profession to which they belong. That we have men calling themselves dentists that are of neither use nor ornament, none can deny, and as there is no

way at present open by which they can be weeded out from among those who are determined to excel, succeed, and progress, we must be firm, and look for help from those who are now preparing for the fray, and will soon be marching, and will signal us to "Hold the Fort" for they *are* coming. Our progress has already been one of mark. What will it be when these veterans are re-enforced by this army of recruits, direct from schools and colleges, with youth, bright prospects, and young America's enthusiasm to help them? What may we not expect? These are to be the coming dentists. Quackery, it seems to me, must step aside. People are already beginning to discriminate between the true and false, and this is to my mind proof positive that we are progressing.

And now the time for our annual meeting has come, when with one accord we have dropped our instruments and closed our offices, with the enthusiasm of last year's meeting completely worked out of us, and come here, many of us at no small sacrifice, and for what? One thing among many others, to promote kindly relations—the mere fact of seeing each other is a healthful stimulus. We spend a few days together, compare notes, exchange ideas, give and receive kind and cheering words, and what is the result? Why, we go home recuperated, encouraged, full of enthusiasm, with a hundred and one ideas that had not, and in all human probability never would have dawned upon our dental horizon; which is not merely of benefit to the operator, but to his patients as well.

Here is where a few dentists, years ago found the *germ* of true progress. If we have made progress in *nothing* else, we can point *proudly* to our *Dental Associations*, and justly claim it there.

[This paper was partially discussed, when a motion prevailed to discontinue further discussion until after the reading of the Essay by Dr. Noyes. For convenience sake the entire discussion on the two papers is made to follow Dr. Noyes' Essay in this volume, on page 55.]

WHY DO OPERATIONS FAIL?

By Edmund Noyes, Chicago.

This question is of great importance to both the profession and the public, and so long as the practice of dentistry shall continue at all, will furnish a fruitful field for research, experiment and observation, and a most practical and useful subject for discussion.

Much has been written during a few years past, and many experiments have been made, having reference to one part of this subject, namely: The influence of electricity or galvanism in causing or accelerating decay, especially in teeth that have been filled. It is to be hoped, and perhaps expected, that this may finally result in some increase of definite knowledge, and consequent improvement of practice, but before that time is reached, (as is usual at the first introduction of new ideas or practices,) there may be some danger from hobby-riding, and very much harm done by attempting to make the new ideas stretch over far more ground than they can cover. Especially will harm be done if any one shall be led to believe that the standard of manipulative skill may be safely lowered.

It should be remembered that the mechanical operation of filling a tooth is rather a *repair* of *loss* or *damage* than a *cure* of *disease*, and, therefore, it would seem probable—as I believe is indeed the fact—that a large part of the failures of operations are brought about by exactly the same causes as made operations necessary in the first instance. This should never be lost sight of. If we do, we are sure to allow many people to expect from us the performance of impossibilities, and many will seek to thrust upon us a responsibility that belongs in at least equal degree to themselves.

Of course these statements apply only to the work of honest, and reasonably competent men, for an operation that is seriously defective is usually doomed to failure by that alone, without regard to other considerations.

I have occasionally—I am happy to say rarely—seen a report of remarks which *seemed* to imply that the gentlemen expected and claimed that when *they* filled a tooth, *that* tooth would never need filling again in the same place. Such a claim is of the same sort as those put forth by a class of doctors who claim to perfectly cure certain diseases in every instance, without exception; both are evidences of quackery, being in defiance of common sense.

We may enumerate at least three classes of causes, which may, either singly or working together, cause operations to fail, namely: first, such original and inherent causes as may be impossible to control; second, faults in manipulation; and third, such incompatibility of filling materials with tooth substance as may unnecessarily increase electrical, and consequently chemical action. Perhaps one reason why the first of these is so little talked about, is because we have so little positive knowledge about it, and it appears to lie chiefly beyond our reach. Doubtless it does belong largely to the dentistry of the future, and it is a territory well worthy the ambition of any man having the ability to acquire any portion of it. If the knowledge of the causes which produce decay of the teeth should ever become so perfect and practical as to lead to the acquisition of means by which we might control or neutralize them with respect to teeth that have been operated upon, it would seem to be but a step further, and a step that we should expect would be soon taken, to acquire control of the same causes in *time* to prevent the necessity for operating at all. *That* would indeed be dentistry of the future.

So far as I know, the resources to that end which can be much depended on, are few and simple, and in a sad number of cases greatly inadequate. The key-note to most of them is the word *cleanliness*. The value of this is in no danger of being over-estimated—at least not by our patients. For this purpose every particle of tartar should be removed, and if it be possible, *kept* removed. I have seen two or three mouths lately in which I believed that what few proximal cavities were found, might fairly be attributed to the accummulation of tartar, which was abundant under the gums between the teeth, and the gums had evidently been a long time inflamed in consequence. In many such cases the causes of decay may be entirely controlled, so that good operations may be relied upon to last a very long time. It is for the promotion of cleanliness, chiefly, that every operation should be most carefully and smoothly finished, and the nicest care and attention given to the proper shaping and contour of surfaces, especially proximal ones.

After doing all that we possibly can ourselves, the most earnest attention must be given to the instruction of our patients, and they *must* be *made* to understand that their own responsibility for faithful *care* is as great as that of the dentist for *faithful work*, and that their efforts are at least as likely to meet with abundant reward. They

must be instructed minutely in regard to tooth-brush and tooth-powder, floss silk, &c. Some of them will need line upon line, and the succession of different patients will make it necessary for us to keep "harping on that string" a good deal of the time. In a great number of the more favorable cases, in which the health is good and the teeth are of fair quality and well arranged, the permanence of *good* operations may be almost positively assured by *sufficiently thorough* and *constant* attention to cleanliness, and we may well be thankful that means so simple and available will accomplish so much.

In some instances of very young children, doubtless something may be done for the improvement of nutrition, by instructing parents concerning proper diet, exercise, and other circumstances that promote general bodily health. It has seemed to me, however, that the malnutrition often noticed in city children of the wealthier classes, is probably owing much more to other causes than to any insufficiency in the supply of proper nutritive elements in the food. In such cases the teeth do not often suffer alone, but there is also some defective development of the bony structures generally, or impairment of the health. A few times, however, I have noticed a good development of the bony system, and sound health, accompanied by very poor teeth. Until dentists are also physicians, such matters may be properly referred to the family physician, or treated in consultation with him. Of course, whatever *can* be accomplished for improvement of health or perfecting of development, will tend directly toward diminishing the necessity for operations upon the teeth, and promoting the permanency of such as *are* necessary.

Whenever there is local disease of the gums, or of the mucous membrane of the mouth, its cure will tend to diminish the liability of the teeth to decay, and promote the permanence of operations. In occasional cases the use of carbolic acid and glycerine, (one drachm to the ounce,) applied to the margins of the gums between the teeth with a camel's-hair pencil, and continued for some time, may bring about some improvement in the character of the mucous secretion.

It remains to be said under this head, that operations may require renewal after a time, without being in any true sense failures, unless they *might have been* so performed as to last longer. If *several* renewals avail to finally *save the teeth*, I should regard the operations as essentially successful.

The second division of the subject relates to defective or improper manipulation, including also the choice of materials with reference to

their mechanical or manipulative qualities, and the thermal and therapeutic requirements of operations, as well as all other *manipulative* details, such as contour or separation, finishing of margins and surfaces, etc.

No observant man can deny that these causes are responsible for a very large proportion of the failures that occur. If we include all operations that are performed upon the teeth, it is my belief that these would be found the *predominating* causes of failure; but if we eliminate all operations except those performed by competent, honest, and painstaking men, then I think that this class of failures will be found to bear a small proportion to the whole number, though still lamentably numerous.

It is *easy* to have defects in operations. It is very difficult, and sometimes impossible, to avoid them. Who has not discovered and remedied defects which so nearly escaped his attention as to convince him that *sometimes* he must have overlooked similar ones? and he must be a fortunate man, indeed, who has not seen any of his own operations that have failed in such a way as to show him that there must have been some defect in their performance.

In the use of cohesive gold, the closest and most exact attention must be given to the minutest details of impacting, or else defects are certain; and my experience with soft foil leads me to think that in ordinary small cavities it admits of very little mitigation in the time or painstaking, or amount of force that it requires. It unfortunately happens that defects are hardest to avoid in the very teeth that are likely to be most harmed by them. It is in the soft, sensitive, and rapidly-decaying teeth that we oftenest find a spot or line of disintegration, extending beyond the margin of the actual cavity or in the immediate neighborhood, but independent of it, or a minute seam in the enamel, running from some point in the cervical wall of a cavity toward the end of the root. Any of these may be impossible of discovery unless the cavity is dry and the attention watchful, and still may be enough to make failure inevitable if neglected.

It is probable that such a thing as *manipulative compatibility* may be worth considering, in the case especially of young and soft teeth. The proper impaction or condensation of gold, either cohesive or non-cohesive, requires a considerable, and probably a nearly constant amount of force, and it is, of course, necessary that the walls against which it is impacted or wedged, should be able to withstand the required

amount of force without injury, and with sufficient *firmness* of resistance to make the joint a *tight* one. The force required for tin is considerably less than for gold, and some teeth may withstand enough for that, which would not bear the amount necessary for the other.

Until within a very few years the amalgams in general use were *inherently* defective, so much so that manipulative perfection with them was impossible. They *would* leak, or make bad margins, or both. This, and the carelessness in their use arising from the necessity for making *cheap* fillings, were enough to justify much of the denunciation that fell upon the material.

The best excuse it had then, was that it was the only thing that stood between certain bad teeth and the forceps.

It has come to pass now, however, that amalgam, considered from a manipulative standpoint, has acquired a meritorious character, and, perhaps, a settled position; but the manipulative skill required for its best use is not at all inferior to that needed for cohesive gold, and the time it takes is so much that it is scarcely possible any longer to use it for a "*cheap*" filling. (I have reference in what I say to Fletcher's "Gold and Platinum" Amalgam, that being the only *good* one I have had experience with.) There are more points to be guarded against imperfection than in the use of gold. The proportion of mercury should be very near exact, and not sufficient in amount to cause the surface portion of the filling to become softer than the underlying portions during the packing of it. The reason is, that this softened portion will not contain the different metals of the alloy in due proportion, but will have an excess of the more soluble gold and platina, so that after scraping it away the remainder will not be *Fletcher's* amalgam, but something different, with uncertain qualities. Mr. Fletcher claims that in such cases there is also a softened portion next the walls as well as at the *exposed* surface, and that the final result will be a dissolving out of the excess of mercury, and leakage.

It requires careful packing, also, in minute details, for it must be *condensed* into its place, and imperfections may be left at corners or edges much in the same way as by the imperfect packing of gold. Finally, the danger from moisture is greater in the use of amalgam than with gold, both in itself considered, and because the access of a little of it is less likely to attract attention. If possible, moisture should be kept away from the margins for an hour or two after the filling is inserted. This may often be easily accomplished by a coating

of gutta-percha and chloroform solution, or some of the varnishes prepared for the purpose. It is *necessary* that all amalgam fillings should be finished at a sitting subsequent to the one at which they are inserted, for they do not admit of it till they are well hardened. If any man will use Fletcher's amalgam with all the care indicated above, I think he will become convinced that a good filling can be made with it, and am sure that he will acknowledge that it is easy enough to have amalgam fillings less perfect than they might be made.

This subject of imperfect manipulation is a very large one. It is not my purpose to even indicate the whole extent of it, and some important departments I have not referred to, being somewhat aside from the main purpose of this paper.

It is fortunate for us that many teeth will be permanently preserved by operations that are considerably less than perfect. There are a great many others that will be saved for a lifetime of service by fillings that are perfectly tight and smoothly finished, with the help of good judgment in regard to contour, and care on the part of the patients, but will surely be lost if the operations fall below that standard of perfection. There are still others that will surely decay after filling, no matter how perfectly it is done or how carefully cared for afterward. It is somewhere near this point, probably, that the importance of the third class of considerations, concerning the electrical relations of filling materials with teeth, becomes most manifest, and if the investigation and experiment in relation to these matters shall lead to the transfer of a portion of the teeth that inevitably decay after being operated upon, to the class of those that may be permanently preserved by the operations upon them, it will be a proper reason for rejoicing, and those who accomplish it will be entitled to gratitude; but in the meantime, *they* (and the rest of the profession should help them) ought to see to it that the new ideas are not so indiscriminately applied, or so inexcusably perverted as to lead to wholesale practices that will result in more *harm* than all the *good* that their right understanding and application is likely to accomplish.

I suppose that healthy mouths, in which the fluids are neutral or slightly alkaline, have little or nothing to fear from a liability to electrical activity. If that is so, it removes at once a very large part of our practice, and that the best and most satisfactory part, from the field of discussion under this head, and gives large scope for the unmolested application of old ideas, and the teachings of long-tried experi-

ence and observation respecting the relative values of different filling materials.

I will not attempt to discuss very much this question of electrical relations, and consequent chemical action. Those who have given it so much special attention are certainly better able to do that.

One part of my desire has been to have the different parts of this subject considered in due proportion, and to indicate the probability that considerations to which we have been long accustomed may still have their full weight, and yet allow to any new knowledge that may be acquired, all the scope of application that shall finally appear to belong to it.

A statement of personal opinions is of very little consequence, but I will make one for the sake of indicating more clearly the position which I occupy, and the basis of the interpretation that I wish to have put upon what I have written. I believe that there are three principal, and two subsidiary, filling materials that have worthy character and indispensable use. Gold has first and honored place, and by far the widest range of application, practically exclusive in six front teeth. Tin is second, and, I believe, nearly as good, (sometimes better,) except when excluded by its color or softness, but these two objections confine it within quite narrow limits. The third is some *good* amalgam. (I wish all the *bad* ones could be so thoroughly *branded* that the sale of them would stop for lack of demand.) There are very numerous cases in which *each* of these three is better and more suitable than either of the others. The subsidiary materials are some form of oxy-chloride of zinc, and some preparation of gutta-percha.

DISCUSSION.

[On Dr. Marriner's Essay.]

Dr. Crouse: Was delighted with the paper. To this Society, and others like it, he owed more of what little progress he had made, than to any other institution, not excepting his college.

There is another matter he would speak of, and that was our schools. This is the important question to be settled — whether we are to be a branch of the medical profession or whether we are to

stand alone. Ours must be an independent profession or else a specialty of the medical profession, which latter, in his judgment, was the better plan.

Medical schools attach dental departments to their institutions to give them strength. On the other hand, individuals club together to get up dental schools, and, in his opinion, mainly for the purpose of bringing themselves before the community by obtaining the title of "professor." There are now many starving dental colleges, because of their excessive number.

The paper was correct in saying that a man who don't attempt to cap pulps is behind the age. He wished the question to be discussed, so as to get right those who are on the wrong track. The essayist seems to think that there are a class of teeth that gold won't save. There are some teeth that gold will not save better than tin, but upon the masticating surfaces tin is too soft, and the color of tin is an objection to its use in exposed places. Were it not for this, we could throw aside gold and do more good with tin. Owing to the position of some cavities in soft teeth, gold is harder to use without chipping the marginal edges of the cavity. There is nothing in these places equal to tin, and he spoke from much experience in its use. We must combine both materials, using tin where we cannot pack perfectly at the cervical margin with gold, and then completing the filling with gold. Tin can be finished easier than gold, without wounding the gums; it can be more quickly worked and saves a certain class of teeth better. If bad operators are to continue to practice, they had better use amalgam. Wherever a man is found who has used gold and then whipped over to amalgam, he thought that that operator had been unsuccessful of late. He hoped that young men would not fall into this rut and get into a place that it is hard to get out of.

Chalky teeth are not numerous, and are better preserved with tin. But aside from that, in hard teeth he knew that his operations are not failures, nor are other men's. This hobby about gold not saving teeth is a wrong theory, and, he predicted it would be short-lived.

Dr. Sturgiss: Thought we had progressed as a dental Society. He had learned as much in the last thirteen years in the Society, as in any thirteen years of his life. To the older members of the Society he owed a debt of gratitude he could never pay. Was taught almost all he knows of dentistry in this Society. It might be humiliating to say it, but he was there to speak the truth.

He advocated this doctrine: that there can be no tin, amalgam or gum that is applicable to all cases. Has seen amalgam and gold fillings twenty years old. But don't think tin will last that long. He has found galvanic action where two different metals were in the same tooth in contact with each other; has never practiced connecting two metals in one cavity. Has removed two metals from a cavity on account of this trouble, and filled with only one, and had no pain afterwards. Does not want young men to understand that they can go home and use two metals in one cavity.

Dr. K. B. Davis: Does not agree with the advocates of the electrical theory. Was not prepared to say, however, that there may not be some truth in it, and hence agrees with Dr. Crouse about using tin for chalky teeth. We all know the consequences of attempting to fill this class of teeth with gold. Experience has taught that tin-foil, in that class of cases, will preserve them better than gold. Also, in another class, namely, temporary teeth, and six-year-old molars, where they decay readily and are soft; he has used tin for a temporary filling, and when the patient got older, removed the tin and substituted gold. Under these circumstances he believes tin better than gold. Don't agree with Dr. Crouse that we can get better adaptation at the cervical margin with tin than with soft gold.

In relation to Dr. Marriner's paper he objected to one point, and that is in relation to his comparison between the medical and dental profession. The paper attempted to show that we were making more progress than the medical profession; but he thought we are apt, as a profession, to indulge in too much spread-eagleism. We must be careful about making invidious comparisons. We are apt to come to the conclusion that we as a profession are making more progress than our medical brethren, because we more readily see our own than that of the medical profession.

In relation to the dental colleges, are they making progress? He thought not in the right direction. It is true that new colleges are springing up, but some are going in wrong directions, and it behooves us as a profession to let our voices ring out against their wrong practices.

Dr. Black: A word about this point of tin and gold. Neither of these metals can prevent decay of itself. The only thing they can do is to exclude the moisture. If this can be accomplished by the use of an indestructible material like gold, it is all that we need; but if by

the combination of gold and tin we can better exclude the moisture, well and good. He does not see why we cannot adapt soft gold to the orifice of a cavity just as well as tin. He did not mean semi-cohesive gold, but ammoniated foil, which can be depended upon.

Dr. Cushing: Had not intended to speak, as the paper covered the ground. It has all been said, only he should, perhaps, side with Dr. Davis in his criticism respecting the progress of the medical profession; not that he questions our progress, but others have progressed too. With respect to filling teeth with tin or soft gold, he thought there may be misapprehension. It is a thing difficult to decide whether one or the other protects the more perfectly. Tin may have better adaptation to the walls and margins, and he thought probable that it may be less liable to injure frail and chalky walls. As to the question of putting the two metals in one cavity, he has never seen any galvanic action, although he has seen many cases of their use. Theoretically there may be objections to such combinations, but he does not believe there is any objection practically to the use of the two metals. In filling proximal cavities, where we leave a surface part tin and part gold, he does not think there is any perceptible galvanic action.

Dr. C. S. Smith, Newark, N. J.: Quite heartily seconds the statement that we are progressing. Believes that our progress is real. But it does not look well in the profession to say that we are the only body, or are in advance of others. He believes we are advancing, and yet when he heard some things said in the dental societies, he was tempted to ask, is it all progress? There are two wings of the dental profession. There is the new departure, which now attracts the Societies. At the Odontological Society the whole time was taken up by one individual who discussed the new theory. In many other meetings it is the only subject which receives attention. The men who originate it are not the profession. We should not give them so much prominence. It bewilders young men to come into the profession and find such a state of affairs, some practitioners saying that gold is not fit to use, and printing on their cards "*No gold used for filling teeth.*" These men are defying the whole profession. He was amused to hear an old veteran whom they called "Old Amalgam," say that in using only amalgam he had been on the right track for thirty years.

In regard to colleges: It may be supposed that their motives are honorable, but he wanted to correct the impression that they all are benevolent institutions, or that their management is entirely honorary.

He made a little arithmetical calculation in relation to a certain college and found that the net profits of one years' session amounted to about $18,000.

Dr. Brophy: It has been said that the only advantage of tin, is that it adapts itself easily to the walls of cavities. He thought tin had some other qualities, or else why is it that upon removal of tin fillings we find the surface of the cavity blackened, and almost as hard as enamel?

One word about colleges. He don't like to hear gentlemen oppose them. They are weak, but are the best means of education we have. The colleges are weak and the students are weak. They are not particular enough about whom they receive. He knew what is required of a student to enter them; it is simply to pay his fees and sign his name without giving any evidence of a preliminary education, yet he claimed the dental colleges are just as good as the medical colleges. The University of Pennsylvania has taken a good stand in this regard. He honored men who are self-educated, but there is no excuse for that now. Hoped the Society would adhere strictly to the qualifications of members, and do all within its power to compel young men to graduate.

Dr. J. A. W. Davis: If we send good wheat to the mill we shall get good flour. It is just so with the dental colleges. We should be the judges of who should go there. They take anybody who will come, but you do not send good men to them. If they do not get good material they cannot turn out good work.

[The discussion was here interrupted for the purpose of reading the paper by Dr. Noyes,—after which the discussion was resumed in both papers.]

Dr. Black: In regard to tin, certainly thought the cavity would have been better off if there had been no tin in it, because the fact of the walls having been black was an evidence of the filling having been leaky; but the conditions were such that decay could not be produced. Has seen light colored decay about tin fillings. We have all seen this. It will take much observation to settle this point; but with care and close examination we can generally determine whether decay is likely to occur. He never yet met with anything that he could possibly construe into the idea that any of these metals have a preservative effect, except in so far as they exclude moisture.

It is essential to have a general and definite plan in operating in every case. If we commence with a child, using different materials

in the same mouth, at random, we are likely to get into trouble. In every case where we put in tin or other materials for temporary fillings we should inform the patient or parent that it will have to be removed at some future time.

Dr. Stevens: Did not wish to depreciate the effects of a good dental education, but the notion that simply passing through a college will make a good dentist, he was not prepared to accept. Believes that there should be a previous collegiate training; and that a man should go through a University and a special school.

Dr. Dean: Uses tin because it is more ductile, because it is an excellent non-conductor, and next, because he believed it has an antiseptic influence upon dentine which has partially disintegrated. He had not used tin for many years until within a year and a half. For fifteen years he thought it was almost as difficult to use as gold, and he could not get as good pay for it. He has used it lately for proximal cavities where they were deep, and believes it acts as an antiseptic on softened dentine. As to galvanic action, he has had no complaint. Inquired again and again, but after the first day or two the patient perceived no galvanic taste. He was very much pleased with this paper, and also the last one on progress. There was one word he did not like, which was that the gold in certain teeth was destructive to them, objected to the statement that gold can be *destructive* to any teeth.

Dr. Crouse: Has seen teeth filled with gold that were afterwards painful, but that did not prove that there was galvanic action. In regard to the combination of more than one metal in one tooth:—our amalgams are made of several metals without causing galvanic action. He has been careful to observe cases where galvanic action might have been expected, and believes it is a myth.

Does not think tin has any other benefit than its adaptability. Gold is not as adaptable. With hard burnishing tin can be forced down and sent home. He does not advocate it for all cases, but the patient is subjected to much less pain, and so he uses it much in cavities where it is difficult to dress the filling down, as tin is easily shaved off, and a smooth surface can be obtained with it, with little difficulty.

In regard to colleges: He did not wish to be understood as advising any one otherwise than to go to college, but spoke of the multi-

plicity of them; when every town has got two or three colleges to satisfy the ambition of men, it is time to stop.

Dr. Black: Was glad if any gentleman can use tin and exclude moisture. He had better use tin extensively; that is the basis of the art; to protect from moisture;—but he must say a word about the amalgam. The electrician amalgamates his plates to protect them from the little local currents, which always occur from little inequalities in the surface. The amalgam in our fillings works admirably in preventing local galvanic action; but if we have two metals and an acid saliva, we must have currents.

Dr. Brophy: Upon removal of a tin filling we find the walls blackened and a hardened condition of the dentine. Could not believe that this blackened condition was owing to leakage, as it is not found with leaky gold fillings, and he could not believe that leakage of a filling made the dentine as hard as enamel. It must be due to some action of the oxide of tin.

Dr. Townsend: Do we not sometimes remove a tin filling without finding this condition?

Dr. Brophy: We almost invariably find it.

Dr. Townsend: Found it only in leaky fillings.

Dr. Cushing: We are sometimes too positive in our assertions. We say a filling does not leak. How can we be certain? Possibly there may be an inperceptible leakage, yet sufficient to occasion oxidation. Moisture to produce this oxidation may come from the substance of the dentine, but we must not overlook the fact that a leakage may exist without our being able to detect it with the naked eye. It is undeniable that many tin fillings have been removed without finding this blackened condition.

Dr. Brophy: How do you account for this exceeding hardness of the dentine?

Dr. Cushing: Did not know that he accounted for it at all. It has been ascribed to the action of oxide of tin.

Dr. Crouse: Have you not seen that glossy hardness where there is no filling at all?

Dr. Cushing: Certainly.

Dr. Magill: Do you ever find it under gold fillings?

Dr. Cushing: Thought not.

Dr. Harlan: We do not often remove perfect gold fillings, and hence have no opportunity of observing the interior of cavities with such fillings.

Dr. Black: Does not find these cases of remarkable hardness of dentine under tin fillings; his examinations have been critical and he does not believe it ever becomes as hard as enamel. The finely polished surface of dentine is apt to deceive us. To say that because of this polish it is as hard as enamel is putting it rather strongly.

FILLING PROXIMAL CAVITIES IN BICUSPIDS AND MOLARS.

By J. A. W. Davis, Galesburg.

Experience and observation have taught me that proximal cavities in bicuspids and molars are the most difficult cavities that we have to fill, in order to make them successful in saving the teeth.

I believe that I can safely assert that there are more failures in the fillings in these teeth by good operators, than any other class of fillings in the mouth.

The great difficulty of thoroughly filling these cavities seems to be universally acknowledged, and if I can only arouse thought and discussion that will lead to more thoroughness, and to greater success in the insertion of these fillings, I shall be satisfied. We have more large and difficult fillings to insert in this class of cavities than in any other location in the mouth, (and it is the large cavities in these teeth that I wish to call particular attention to in this paper,) and the nervous exhaustion that is inseparable from the faithful performance of our duty in these fillings, is, I presume, perfectly familiar to all. I have often deeply sympathized with patients in these long and tedious operations, and have long endeavored to make them as short as consistent with thoroughness, both for the benefit of the patient and myself.

The causes of so many failures in the fillings of proximal cavities in bicuspids and molars are the following: 1st. A defective preparation of the cavity, especially the cervical margin. 2d. Injury to the

margin in inserting the filling, by over malleting. 3d. A want of thorough adaptation of the filling to the margins of the cavity. 4th. Improperly finishing these fillings.

In the preparation and filling of these cavities, is it possible for us to obviate these causes of our failures? It may be impossible to do so in every case, but I am inclined to the opinion that we can do so in a far greater number of cases than we have hitherto been doing, if we will only adopt better methods and earnestly endeavor to be more thorough in every detail of these operations.

These cavities should be opened from the crown surface with a fissure-burr, if there is not an opening there already. Should there be no opening on the crown surface, a thin file may be passed between the teeth, and from this separation we may rapidly cut and open the cavity by cutting down the enamel until the interior parts are entirely brought into view.

We should invariably apply the rubber dam in all cases, before preparation of the cavity is completed, so as to exclude all moisture, thereby enabling us to see that we get the margins all perfectly smooth.

I contend that no operator can prepare this class of cavities as perfectly without the dam as he can with it. Having the rubber dam securely adjusted so as to exclude all moisture, we proceed to remove all disintegrated dentine in the cavity. This being accomplished, the cervical margin should be cut away until a sound, solid, and a secure border is obtained, which should then be made as smooth as possible. An imperfect cervical margin being a very prolific cause of failure in these fillings.

I feel like urging extreme care in their preparation. We should not stop after a hasty and careless preparation and console ourselves with the delusive hope that it is all right, but we should in every case never stop short of an ever living consciousness that knows that this margin is prepared just as it should be, to avoid all danger from the recurrence of decay.

The buccal and palatal margins should next be cut away until a firm edge is secured, after which it should be thoroughly polished to facilitate the adaptation of the filling.

The cavity should now be so shaped as to permanently retain the filling. With suitable sized fissure-burrs and the engine we can very readily cut a groove or dovetail on each side of the cavity, if the tooth will admit of it; in some cases, where the dentine is very sensitive, I

make two retaining pits on each side of the cavity, and follow up the fissure on the masticating surface, and make a retaining pit there unless both sides of the tooth are decayed, and if they are, I bridge across the crown surface, in nearly all cases of bicuspids, also in some cases with the molars, so as to make the filling perfectly secure from removal by mastication or any ordinary force that may be brought to bear upon it. There will very frequently be found in the cavities a deep undercut or overhanging projection of enamel at either the lingual or buccal corner, and sometimes at both; this should always be cut away, as it is almost impossible to so fill them as to avoid future fracture, and thus injury to the integrity of the entire filling.

Having the cavity properly shaped, and the margins all perfectly smooth and ready for the introduction of the filling, I now wish to call your attention to an appliance to aid in the filling of these cavities, that I have found to be very efficient in securing successful results and one which greatly lessens the time and weariness both to myself and to the patient. I refer to the matrices introduced by Dr. Louis Jack, of Philadelphia, for filling proximal cavities in bicuspids and molars.

About a dozen pairs of these matrices are requisite to meet the varying cases that occur in practice; however, occasionally it will be necessary to have one of unusual size and form to meet special cases; when the space is very large, or when from fracture of the outer plate of enamel, a steel one will not remain in position. For this purpose one may be made of boxwood that will answer every purpose. Having, then, about a dozen pairs of these matrices, we select one of suitable size and shape, and with the pliers take it up and push it up between the teeth which are to be filled, until it presses pretty firmly upon the rubber dam and gum at the cervical margin, and impinges tightly between the teeth. It should now be wedged firmly against the tooth to be filled, with wedges of boxwood or other hard wood; these are to prevent it from moving while packing the filling. The matrix being properly adjusted to its place, the cavity is now ready for the reception of the gold.

It will be readily perceived that we have transformed this cavity from a compound proximal to a simple one by the use of this little matrix.

For commencing these fillings I generally use Williams' cylinders slightly annealed. If I do not start the filling from retaining pits, the cylinders used should just be large enough to maintain their

places firmly when condensed. When I start from retaining pits I use No. ½ and No. 1; after the retaining pits are perfectly filled, I take a cylinder long enough to reach from one retaining pit to the other. Great care should be taken to thoroughly adapt these first pieces of gold to the cervical and other margins, either with the mallet or hand pressure.

After we have the cervical margin well covered, the gold may then be annealed more and more as the filling progresses, until the cavity is pretty well filled, when No. 20 or 30 rolled gold should be used to finish the filling. Extreme care should be taken to consolidate the gold at all points as the filling progresses, paying particular attention to its solidity against the matrix where it comes in contact with the margins of the cavity. The filling being now properly introduced and condensed thoroughly, it only remains for us to remove the matrix and finish up the filling. It will be found if the selection and adjustment of the matrix has been correct, that very little filing and cutting down of the plug will be required, and if the packing has been carefully performed, that the gold will be solidly condensed at every part of the filling.

The finishing of the filling does not differ from the usual method pursued. I usually open still farther the lingual space, which is easily accomplished with suitable files and corrundum disks. The peculiar form of the depression in the matrix produces a space which may be increased at pleasure. In many cases where the tendency to caries is very great, we should cut quite freely from the inner plates of enamel, doing this after both the adjoining fillings are put in, cutting down both gold and enamel together, allowing the fillings to touch only at the prominent outer parts. The result is then, an imitation of the exceedingly oval bicuspid; the immunity of which from decay all must have observed. Having thus far finished the filling with files and disks, I next take strips of emery cloth cut to the proper width, and with these polish the proximal margins, first using Nos. 1 and ½, and finally finishing with crocus, which gives a fine finish and a beautiful polish. I would urge care in finishing the cervical margins, never stopping our efforts at this point until we positively know that every part of the margin is perfectly smooth, with no projecting gold to induce a recurrence of decay, but on the other hand, we should continue to cut and polish at this point until the margin is perfection itself.

Then, if this margin was thoroughly prepared before the filling was introduced, and if the filling was perfectly adapted to it without

injuring it by over malleting, and finally, if the cervical margins are perfectly dressed and polished, I think we have obviated the causes of failure in these fillings to a great extent.

I trust that those who have not tried this method of filling proximal cavities in bicuspids and molars, will do so at their earliest convenience. Simplicity of methods and greater success in the performance of our work are the two leading wants of our profession to-day. Notwithstanding the number of faithful operators is increasing, and the standard of operations is rising, the manner in which fillings are made by two-thirds of the dentists of this country is a reproach to us as a profession, and a disgrace to the age in which we live.

For the better serving of our patients, I have a hope that step by step the methods of filling may be made easier, thus within the capacity of a greater number, and more sure, until at length all may be able to reach very near perfection in this now very difficult operation.

DISCUSSION.

Dr. Talbot: There are two points in the essay he does not approve of, viz.: the drilling of retaining pits, and the use of the matrix. In drilling these pits there is danger of exposing the pulp,—or by bringing the filling so near the pulp, to endanger it by sudden changes of temperature conveyed through the filling;—and where walls are weak of running the drill through them.

The matrix involves too much guess-work, especially in lower biscuspids.

Dr. Crouse: Differs largely with the paper and should take directly opposite views.

The essayist recommends cutting through the grinding surface to get to the cavity and separating teeth with a thin file. Now this is made necessary by his using the matrix; let him lay it to one side, and see if this is necessary. Take teeth that are not much decayed where there is a medium sized bicuspid cavity, in an adult patient with hard and healthy teeth, and a better operation can be made if the cavity is left as a simple proximal cavity. He objects to cutting from the grind-

ing surface of bicuspids, because it leaves only a little enamel between the two cusps of the tooth, and the danger of its fracture is thereby increased.

Dr. Black: Would caution operators against the use of the matrix. It makes an operation very easy but he feared we might fail to reach many of the corners, especially in small cavities which are larger at the bottom. Doubts the propriety of filling under overhanging margins of enamel, as his experience taught him that decay oftenest recurs in these positions. A wide cut may weaken the tooth, but it adds much to the permanence of the filling.

Dr. Cushing: In cavities with overhanging edges we must be very careful on account of the impossibility of *seeing* what we are doing. Sometimes with the magnifying glass we can find very apparent defects not otherwise observable, and if we were to remove these teeth after the most perfect operation we should still find, many times, imperfect fillings at these points.

Dr. Brophy: Doubts the usefulness of cylinders, and does not approve at all of large ones. He first separates teeth by means of wedging until there is room enough to work between the teeth.

THE EPITHELIA AND SOME OF THEIR DERIVATIVES, ESPECIALLY THE DENTAL GERMS.

By M. S. Dean—Chicago.

The writer commenced with a few prefatory remarks, in which he stated that dentists have no right to call themselves professional men, nor to rank dentistry among the learned professions, unless they understand, besides the details of general practice, the *fundamental principles upon which their specialty is based;* that the minute anatomy of the structures with which the teeth are most intimately connected, and from which they emanate, should most certainly be carefully studied, as well as the dental organs themselves. In order that what would follow this essay (on the origin and development of the teeth) might be more easily comprehended, it would be necessary to refresh the memory and, if need be, to increase our knowledge regarding the *Epithelial elements*, which are the important factors in these phenomena.

In this essay, the writer stated, he had endeavored to collect and arrange the most recently discovered facts relating to the subject treated, and to present them in a concise and simple form; and hence he claimed very little originality in what he had to offer.

The authors whose works he had studied and compared, and upon which his knowledge is principally based were: Legros and Magitot,

Stricker, Waldeyer, Tilbury Fox, Von Recklinghausen, Eberth, Klein, Wagner, Neumann, Piffard, Duhring, Rindfleisch, Biesiadecki, Billroth, Küss, Beale, and Frey, besides the usual medical text books. From these works he had been able to learn the views of many other distinguished authors whom it is not necessary to name here.

He remarked that if the hearer whould give close attention to the reading of this paper he would be astonished to find how easily the origin and progress of the development of the teeth (which he would afterwards attempt to explain verbally,) would be comprehended.

Drawings of sections of the Epidermis, showing the strata of cells, their forms, relations and changes, were briefly described, and the essayist read as follows :

Mr. President, Ladies and Gentlemen and Brethren in the profession :—While I shall make the *origin* of the Epithelia my starting point, I shall go over the ground hurriedly until these elements are found in near relation to the developing dental organs.

The human organism is first represented by a single cell, and then by an *Epithelium*. Modern histological research has proven that "the *first layer of the blastoderm* is of an Epithelial nature," though it was long believed that the first organ that appeared in the embryo was the *nervous system*. (Kuess). This layer becomes the first organic membrane that distinguishes the individual, and is called the *germ* membrane, or the *blastodermic* membrane. It is soon divided into three "layers" or "folds" which have received different names by different authors, but which are generally known as the "*external*," "*internal*," and "*intermediate*" layers. From these three germinal layers, or folds, originate all the tissues that compose the organism.

But I shall confine this paper to a partial description of the *first* of these three layers, the external, the first layer of the blastoderm, the corneous, or germinal layer, as it is variously called.

From this "*embryonal stratum*," the epithelia of the external surface are derived, and, according to Frey, the cells of this layer take part in the construction of the brain and spinal cord, together with the higher organs of sense. The internal coat of the veins, arteries and lymphatics, is composed of a single layer of epithelium, (Eberth, Von Recklinghausen, Kuess) and the capillaries and smaller veins are formed *entirely* of delicate flattened epithelial cells, (Eberth). In short, the epithelia that grow *outwardly* (Rindfleisch) clothe the entire surface of the organism, integument and mucous membranes in uninterrupted connection, while the epithelia that grow *inwardly* fill up the cavities hollowed out in the parenchyma of the body, and are called the glandular cells, or the glandular epithelium. Both of these systems are produced from the *same embryonal foundation*, and are a direct con-

tinuation and involution of the *superficial epithelium*; the only difference consisting in the *direction* of their growth. For instance, the glands are formed from cellular shoots that emanate from the lower surface of the epithelial germinal layer, *i. e.*, the lower layer of the stratum malpighii, ~~the stratum~~ which penetrate branchingly inwards, in order finally to become hollow from the free surface up to a certain depth. This growth takes place (Rindfleisch) by division of the *existing* epithelial cells which is repeated again and again. In the formation of the hair follicle a similar process takes place.

But I cannot dwell upon the various structures that are formed by the epithelia, the various functions they perform, nor the multiplicity of forms they assume; you are already, it is presumed, acquainted with the importance of this corneous, or external germinal layer and, in general, with its productions.

The epithelium of the oral mucous membranes, from which the teeth (enamel organs) directly originate will require more particular attention.

While Koelliker, Magitot and others have demonstrated the *epithelial* origin of the enamel organ, it is generally conceded that Huxley was the first to definitely announce this fact, although the literature upon this subject has pointed more or less significantly to this origin of the enamel organ for more than a century. Hence we see the necessity of familiarizing ourselves with the epithelia, in order to comprehend the origin and growth of these organs, of which we claim to possess a special degree of knowledge.

In that wonderfully accurate (for the age in which it was written) and almost inspired work, upon the development of the teeth, by Jourdain, published in 1765; he says: "After what I have said concerning the early formation of the teeth, it will be seen that I regard the dental cord as a *placenta* which carries the nutrition (suc) to the body which is formed," and Oudet, as early as 1822, asserted that the teeth were dependent upon the "tegumentary system," and that they were the analogues of the hair, nails, hoofs, etc.*

These, and other authorities that might be cited, show that the conclusion arrived at by Huxley might be naturally drawn from facts already known, though they were more explicitly stated by this latter author.

*See page 9, extrait d' un memoire lu a l'academie royale, July 1st, 1822, by J. E Oudet.

You are aware that the mucous membrane from which the teeth originate, is a direct continuation of the outer skin, and that the anatomical description of one will essentially apply to the other.*

In coarser anatomy, the skin and mucous membrane are described as consisting of two layers: the epidermis or cuticle, and the dermis, cutis vera, or corium.

But, since the days of Malpighi, the founder of microscopical anatomy,† the skin and mucous membrane have been regarded by closer anatomists as being constituted of three layers—that is, the epidermis was found to be *separable*, and its external layer was called the *stratum corneum*, while the lower layer took the name of its discover and was called the *stratum malpighii*.

This latter layer, however, is designated by several other terms, viz.: rete mucosum, corpus mucosum, mucous layer, etc.

Lately, however, the epidermis has been further subdivided by some histologists who have given special study to these structures.

Prof. Piffard, in his recent work on Dermatology, divides the epidermis into three distinct layers, viz., the *stratum corneum*, *stratum lucidem*, and the *rete malpighii*. According to this writer the first and last layers named, "are separated by a pretty distinct line of demarkation, which consists of a *thin transparent layer* of cells differing from both those in the corneous layer and those in the rete malpighii."—This layer was noticed and previously described by a histologist by the name of Oehl, and also, more recently, by Langerhans and Schroen, two German anatomists. However, in the many works written by eminent observers upon this point, none of them, as far as I can learn, regard the epidermis as composed of more than two layers, the *living* and the *non-living* epithelium.

If it will not seem presumptious in me to offer an opinion upon this point, I will state briefly my reasons for believing this "*stratum lucidem*" to be an *abnormal* or *pathological* production.

I find that many of the noted histologists—if not all of them who have made the skin a special study—have occasionally noticed the presence of certain cells in the *rete malpighii*, which differed markedly, in size, form and *transparency* from the true epithelial cells. These cells are said to resemble the connective tissue cells, and by many

*For a minute description of the oral mucous membrane see Klein, in Stricker's manual of Histology.

†Marcello Malpighi (1628—1691) and Anton Van Leeuwenhoek (1632—1723) are generally looked upon as the fathers of microscopical anatomy.—*Frey*.

authors they are considered the *wandering* connective-tissue cells. [You are probably aware that Von Recklinghausen discovered that some of these cells are *attached*, while others are *free wandering* cells, or amoeboid cells.]

These latter elements are derived from the corium or true skin, and are sometimes found partly in this, and partly in the malpighian layer; and cells of like appearance are found more or less frequently in different parts of the latter layer.

These are established facts and show that the lower layer of the epidermis may be invaded by numbers of cells from the adjacent corium.

The appearance of these wandering cells, as described by Biesiadecki, Frey, Rindfleisch and others, is quite different from that of the true epithelial cells, and may be readily recognized by the *lusture* of their protoplasm, their small size and greater length.

To my mind, these are evidently the cells that constitute the so-called *stratum lucidem;* and they are also the same cells which are mentioned by Frey, as the lymphoid cells which have escaped from the blood-vessels, and which are distinguished by their " brilliant borders," etc.

That white-blood corpuscles, lymphoid cells, and connective tissue cells (which may be considered essentially the same), do migrate into the malpighian layer of the epidermis, there can be no doubt. This is a fact concerning which there is no dispute among histologists. Now there is another fact which I wish you to connect with the one above stated, and that is: that when the epidermis is irritated by disease, a host of these migratory cells rush into the malpighian layer; but they must necessarily be arrested in their career outward when they come in contact with the impervious barrier which is formed by the *stratum corneum.*

Upon this point we learn from Biesiadecki, that the number of these cells is augmented in the irritated skin, and that they are sparingly found when it is in a healthy condition. And Billroth says: " innumerable wandering cells infiltrate inflamed tissues, immediately after they have been inflamed." Apropos of this subject—Rindfleisch alludes to some interesting observations made by Biesiadecki and Pagenstecher, in which these histologists found, after slight superficial inflammation of the skin, *wandering* cells in all the youthful strata of the epidermis—*i. e.* malpighian layer.

The experiments of Cohnheim, are still further evidence upon this point. He introduced fine anilin blue into the lympathic sac, in the back of a frog, and on irritating the cornea with a caustic found that numbers of wandering cells colored with this substance collected at the cauterized point, and hence concluded that, at an irritated point white-blood corpuscles wander from the vessels into these tissues. Although I have at hand an unlimited amount of testimony, from the highest histological authorities, showing that the cells possessing the same characteristic appearance as those composing the so-called *stratum lucidem* may and do emigrate into the malpighian layer of the epidermis; and also that the *numbers* of these cells are increased when this layer is irritated by disease, I am confident that I should only weary your patience by adding further evidence upon this point.

Now suppose the epidermis on being irritated by disease should become peopled by a host of these emigrant cells, what would be the natural result? On entering the lower strata of the rete, their course is toward the outer surface; they glide between the soft and yielding cells of this layer until they are interrupted by the *stratum corneum* where they would congregate in sufficient numbers (in some instances) to form a pretty distinct lucid line of demarkation *between* the two layers of the epidermis; and *this* might constitute the *stratum lucidem* of Piffard, Oehl, and the two German authors before named.

The theory advanced by these authors is weakened, and rendered more *improbable* from the fact, that such histologists, as Biesiadecki, Neumann, Rindfleisch, Frey, Von Recklinghausen, and a host of others that might be named, have overlooked entirely this so-called *stratum lucidem*; and what strengthens the theory I have advanced, in regard to the transparent line observed by these authors, and renders it *more probable*, is the fact that Piffard admits that the specimens from which his observations were made, were taken from portions of the skin that were more or less diseased.*

In view of all these facts, I think we may safely conclude that when the transparent line appears between the two layers of epidermis, it results from an abnormal collection of wandering cells.

The prevailing opinion is, then, that the epidermis is separable into two, and only two layers, the corneous, and malpighian, and that

*Piffard says: "my attention was first particularly attracted to this line of separation * * * in some sections of a *leprous stump* which had been stained in carmine, etc., * * * This appearance I have met several times with more or less distinctness in sections of prepuce near chancres."

both of these strata are composed of epithelial cells, viz.: the young cells, the adult cells, the aged cells, and the dead cells.

The cells composing the *stratum corneum*, in their infancy, belonged to the lower layer of the *stratum malpighii;* in their youth, to the more external stratum, known as the prickle, spinous, ridged or imbricated cells, (all of which terms and many more are applied to the cells represented in figure 1); and, in the middle life, belonged to the polygonal cells which lie still nearer the external surface; and in old age, to the elongated, flattened layers of cells in which the nuclei have nearly disappeared, and which in death occupy the most external or corneous stratum.

The lower stratum of epithelial cells, (the infant cells) stand vertically upon the corium, and are called the columnar, cylindrical, or prismatic cells, and are said to be destitute of cell-wall. [In the embryo, according to Henle, they often appear like a stratum of protoplasm regularly studded with nuclei]. Their nuclei are large and ovoid, as represented in the figure.

The next layer of cells, (the youthful), have grown larger; and, besides their "imbricated" appearance, are surrounded by a thin cell-wall *periplast* (Huxley), or *formed material* (Beale). The cells above these assume larger proportions, and a more polygonal form, and represent cells in *middle life*. The cell-wall (or periplast) has increased in thickness, while the nucleus has diminished in size. The cells still external to these are the *aged* cells, and the nearer they approach to the stratum corneum, the larger will be the amount of "*formed material*" that surrounds the nucleus, and the smaller will be the nucleus, until only a trace of it is visible—or until it entirely disappears, when it enters the corneous stratum, and becomes a lifeless protecting covering for the living cells that grow up beneath. They have gradually become flattened epithelial scales which are so strongly glued together that—to use the figure of Prof. Kuess—they are as "impervious as India rubber."

Both of these layers of epithelium are destitute of vessels, at least none have been discovered in these tissues, and until lately they were supposed to be destitute of *nerves*.

To Langerhans, it would seem, according to Neumann, belongs the credit of discovering in the malpighian layer, non-medullated nerve fibers. His experiments were verified by Podcopaew, who saw nerve fibers between the cells of the rete mucosum in the skin of a rabbit, and proved their connection with the network in the corium.

The epithelium is regenerated from the cells that stand vertically upon the corium—at least this seems to be the general opinion of Physiologists, though we have some high authorities that do not fully assent to this view.

According to Ernest Wagner in the healing of wounds, "most surgeons hold fast to the double origin of the epithelium; partly from the normal epithelium of the borders of wounds and partly from the uppermost granulation cells."

Rindfleisch inclines to the opinion that the connective-tissue cells, or the wandering cells (which we have already discussed in this paper) *may* become, by a kind of infection, *when in contact* with the epithelium, true epithelial cells; though in describing the origin of the glands, he says: "its growth takes place by a division of the *existing* epithelial cells, which is repeated again and again."

According to this author, Burkhardt was the first to designate the uppermost layer of connective-tissue as the matrix of the epithelial cells.

It would seem that Rindfleisch believes that the epithelial cells may not only arise from their kind, but that embryonal formative cells may become epithelial cells; but only when they come in contact with such.

Piffard and Schroen believe that each layer of the epidermis regenerates its kind. And yet the weight of authority seems to be with Waldeyer, Thiersch and a host of others, which may be summed up in the words of Billroth, who says: "In the whole subsequent course of development, a derivative of one germ-layer never developes a tissue that was originally formed from another; in other words, if the division of the cellular embryonal plan has advanced to three germ-layers, there are no more wholly indifferent cells, but all newly-formed cells developed from previous ones, can only develop to tissues lying within the territory of the germ-layer whence they originate; * * and true epithelium or glands, can never come from the derivatives of connective-tissue cells; * * the young brood can only develop to *certain prescription types of tissue* which depend on the embryonal origin of the mother cells."

With this brief description of the epithelia I will proceed to the main and I trust most interesting branch of my subject, "the Development of the dental germ;" and as I must constantly refer to the illustrations upon the wall, this can be better explained orally.

In this, although I shall refer to different authorities, I shall follow principally Drs. Legros and Magitot, from whose work on the "Origin and formation of the dental follicle etc.," many of the illustrations are copied.

DISCUSSION.

[The essayist then proceeded to give an extemporaneous discourse upon the development of the tooth germs, occupying fully an hour and a half, which was listened to with the closest attention by a very large audience. The subject was made easily comprehensible, even to non-professional attendants, by frequent reference to numerous diagrammatic drawings in colors, executed by the lecturer's own hands. It is a matter of regret that we cannot now publish this lecture on account of the great expense a reproduction of the drawings (without which it would hardly do justice to the author) would entail. We cannot however abstain from expressing the hope that we may soon see it in book form, so that the valuable information it contained may become as widely disseminated as possible.]

Dr. Black: After such a display of knowledge it would seem that nothing could be said, except in commendation. He had never heard a better presentation of this subject, nor seen in the works of our best authors so good a one.

He had himself studied this subject pretty closely from sections taken from the human foetus at the different stages of development, and he only wished that the lecturer had followed throughout the evolution of the teeth in a single animal species or in the human foetus.

But the sources from which he has drawn his material would render this impossible, and he (the speaker), wondered that he has presented this subject so concisely.

We have in the human embryonal jaw this *apparent* groove, (that is represented in the diagram), extending the whole length of the jaw; but, as was stated, this groove is always filled with epithelial elements —there is no *real* groove. He had his note-book ready to record any error the Doctor might make, but he had his points well guarded. This is indeed a great subject for the histologist as well as the physiologist. The young hair follicle represented here, (referring to another drawing), is histologically very similar to the enamel organ, and so are all the glands that originate in the external germinal layer.

He must dissent, however, to the doctrine, that the follicle of the permanent teeth are derived from the epithelial cord of the temporary ones. His observations led him to believe that the enamel organs of the permanent teeth are derived directly from the epithelial lamina.

Dr. Dean: Perhaps Dr. Black has made his examinations on embryos at a later stage of development than those studied by the authors named in the essay and lecture; if so, this might account for the difference of opinion in regard to the origin of the permanent teeth. For if his observations were made on the sixth-year molars, (the budding of the enamel organ of which, commences about the 16th week of foetal life), he would find that *this* did ~~not~~ originate from the epithelial lamina.

But the other twenty that correspond to this number of temporary teeth, according to Magitot, Koelliker, Tomes and others originate from the epithelial cord of the temporary follicles; while the 2d molars originate from the cords of the 1st molars, and the 3d from the cord of the 2d molars. Does not make this statement on his own authority, but upon that of the authors just named.

Dr. Black: His observations had not been confined to the development of the sixth-year molars, but all the other teeth have been included.

Dr. Dean: Was still determined to reconcile the views of Dr. Black with those of the authors cited. Now the enamel organs of the permanent teeth, originate and branch off from the epithelial cord, *before* the cord is severed from the follicles of the temporary teeth. But *soon after this*, the cord is detached from the temporary germ; now if examinations are made, at this period, the permanent follicle will *appear* to originate directly from the epithelial lamina; whereas that portion of the cord that is immediately connected with this lamina is the same that furnished the enamel organ of the temporary tooth.

If examinations are made at this stage of development alone, one would naturally conclude that the permanent teeth originated *directly* from the epithelial lamina in the same manner that the temporary ones do.

Dr. Black: Examined them at various stages of development from the eighth to the sixteenth week, in a great number of cases, and must still maintain that he never has found the *secondary* enamel organ to emanate from the follicular cord of the temporary tooth.

There is a great difference in the development of the teeth in the human foetus and those of the mammiferous animals; this difference, however, is in the *time* and not in the *mode* of development.

OPERATIVE INSTRUMENTS.

G. S. Miles—Jerseyville.

In the attempt to prepare an article responding to the subject just stated, I find it a task far more difficult than I at first imagined.

It would seem that a discussion of the proper instruments to be used in dental practice might not be an inappropriate subject for our deliberations, but the range is so large and the variety so great, I find I cannot do justice to the subject, and if it should be the means of exchanging views among the members of this Society, my object will have been accomplished.

Among the great variety of patients, whom we are called upon to treat, there is an intelligent class who appreciate the services of the dental operator, who know the importance and worth of their teeth, who thoroughly understand that if their teeth are predisposed to decay, their only remedy is to attend to them, and arrest the progress of the decay, by such means as will best conduce to that result. There are many also of a sensitive, nervous temperament, who approach the dental operator with fear and trembling, hence it is desirable that whatever the operation upon the oral cavity, it should be performed as gently as possible and as expeditiously as is compatible with thoroughness.

In order to meet the requirements of our patients, and of these classes in particular, it is highly important that the operator should be provided with suitable instruments, that he may be enabled to perform the work so easily and expeditiously as to remove from the mind of the patient the dread that so often attends them.

Intelligent persons who appreciate the value of their teeth, desire to have nothing overlooked, but everything done that is necessary to preserve them, consequently it is highly important to institute at first a thorough examination of all the teeth, that the operator and patient may know their true condition.

To perform this examination, a small steel excavator,—about the size of White's No. 5, I think, is very suitable—with the point bent at an obtuse angle, and with the aid of a suitable mouth-mirror, and a small magnifying glass, decay may be readily detected. At times the teeth are so crowded together that decay is not so easily found; but with a delicate instrument and suitable glass we are able in almost all cases to detect it between the teeth if there be any.

In separating teeth that are decayed approximating each other, in order to obtain space to fill, I would use finely tempered chisels, to cut away the slender walls of the cavity. I think the separations in most cases can be made more readily with these chisels, and with more comfort to the patient than with files. For cutting away enamel and dentine, I think the double-end enamel chisels of Dr. Jack are very excellent. With no disparagement to others, the sets of chisels from the designs of Drs. Butler, Abbott and White are very well adapted to the work they are designed for, in cutting down the enamel walls from the various cavities of decay, which we are called upon to prepare for filling. After the separations are nearly completed, the edges of the cavity, or the tooth substance, may be made regular, and finished with files and Arkansas stone. In removing the decay, I do not think a great variety of instruments are required. While there may be some dissimilarity in the angle of the points and size of the instruments, the larger portion may be classed under the heads of hatchets and hoes. With an instrument suitable to the size of the caries, I would lift out the loose decay, and if practicable perform most of the preparation of the cavity for filling with the dental engine. I say if practicable,—by this I mean to say that there are cases where I would not think it advisable to use the engine. While I consider it an indispensable assistant to the dentist, I do not think an operator should feel that it must always be employed. It has its office to perform, an important one; but some of our patients are very timid, and fearful of its use, and the decay to be removed is sometimes in an inconvenient locality for using the engine. In many such cases, a cavity can be prepared as readily, and with more credit to the operator in the eyes of the patient with other instruments than the engine; but in removing the decay and shaping cavities for filling in a great number of teeth, the dental engine is of the *highest importance*, and not only for the uses above enumerated but a good dental engine is a very important aid for smoothing and polishing the fillings. With its use, gold fillings may be cut down and finished far better than in the old method, with more ease and comfort to patient and operator, and in less than one half the time.

It seems unnecessary to designate any particular instruments suitable for use in filling teeth, as there are so many different methods of introducing the gold and various preparations of gold requiring different instruments for its introduction; and also from the fact that there are

quite a number of styles of instruments, the designs of as many operators, that are well adapted for the use intended. Instruments with fine serrations, I think, are preferable for general use to those with deep ones, and also to smooth surface fillers. An operator having a set, or what number of instruments he may need, of those designed by either Drs. Varney, Butler, Atkinson or Abbott, may feel that he is well equipped for the work.

The extraction of teeth is attended with a good deal of dread by the larger portion of our patients. The severity of the operation is such that particular pains should be taken to select such instruments as are suitable, and as will assist the operator in removing the troublesome teeth in the easiest manner. From White's catalogue I would select Nos. 13 and 48, for upper central and lateral incisors. Cuspids and bicuspids, No. 11. Molars, No. 19, two pairs, right and left. Third molars, No. 10, for either side. Lower jaw; incisors, No. 46. Cuspids and bicuspids I prefer an instrument similar to No. 14, but for the canine it ought to be of greater strength. For lower molars, I have an instrument with pointed, or as it is called, "cow horn beaks," for either side, which I prefer to any other style, similar to No. 16. For Dentes Sapientiæ, I prefer an instrument very much like the one used for extracting the bicuspids, only the beaks should be shorter and wider.

Very seldom do we need instruments for extracting teeth other than those enumerated above.

At times, we find teeth with the roots so branched and firmly imbedded in the alveola, that it seems impossible to remove them without their being divided; in such cases, Nos. 66 and 67 are very useful.

We are often called upon to remove roots of teeth, for this purpose, No. 65 (Arrington), and also Parmly's bayonet-shaped, are, I think, very suitable. Lower jaw, Nos. 41 or 44 are the ones needed.

In extracting the upper teeth, the position of the operator should be by the right side of the patient, the first two fingers of the left hand placed beside, or as near as practicable to the tooth to be removed, and supporting the head upon the *rest* of the chair.

In extracting the upper incisor, a rotary motion will generally break the attachment and allow the tooth to be removed without trouble; but at times the points of the teeth are curved and an inward and outward motion is required. The cuspids require generally an

outward and inward motion combined with a rotary. The bicuspids being less round and the roots of the first generally divided, require an outward and inward motion.

The upper molars require first an inward, then an outward motion, from the fact that the labial roots are shorter than the palatal root, and generally the palatal root diverges in a greater angle, rendering it more liable to be broken were force applied outwardly at the first.

The lower incisor roots are generally more flattened than others, and a gentle outward and inward motion is best; the lower cuspids and bicuspids generally have round roots, or nearly so, and a rotary motion, in combination with the other is generally best. The lower molars have roots flattened and are generally parallel to each other, and an outward and inward motion is best. I consider it highly important that the operator should keep his eye directly upon the tooth to be removed, that he may know just what force he is applying and the exact effect it has upon the tooth. Where the crown of the tooth has been decayed away for some time, leaving the root somewhat absorbed, not very firm, but the surrounding tissue very sensitive, I frequently use a wire instrument with a screw cut at one end, remove the decay from the nerve cavity and insert the screw. It may then be removed very easily, and with less pain than by cutting away the inflamed gum in order to use the forceps.

Many persons dread the use of the lancet nearly as much as they do the extracting of the tooth, and I think great care should be used not to inflict unnecessary pain. Where the crown of the tooth is sufficiently firm to withstand the removal of the tooth without breaking, all that is required is to run the lancet around the tooth, freeing the gum from the neck of the tooth to the alveolus; this will prevent the tearing of the flesh, and is all that is necessary—hence there is no necessity for deep cutting, causing at times severe pain. Occasionally the gums are so inflamed from disease, or have so receded from the teeth, that the use of the lancet is not required.

There are quite a number of different sets of scalers for removing salivary calculus from the teeth which are well adapted for the work, among which are those of Drs. Howe, Abbott and White. The presence of salivary calculus is so injurious to the teeth and gums that its thorough removal is highly important, and great care should be taken that every particle should be removed from between the several teeth.

For this purpose, delicate instruments are required, and those made from the patterns of Drs. Abbott or Howe are peculiarly adapted for the work.

It would extend a paper too long to attempt to speak of all the instruments that are deemed essential in dental practice, and I will leave the subject for a more minute discussion by the members of the Society.

DISCUSSION.

Dr. Crouse: Was pleased with that portion of the paper which referred to the excessive use of the burring engine. He had observed in yesterday's clinic, how some operators persisted in using the engine when they could have done more effective cutting with a hand chisel. It may be very easy and pleasant to the operator to use the engine, but it is much more severe upon the patient than an excavator. The friction generates heat, and the burr drags away nerve fibers, instead of cutting them, as does a sharp excavator. Some of the operators at the clinic, he had observed, were not particular enough in first removing the tartar and tobacco stain from the teeth, so that they must have found it difficult to tell where the decay stopped.

There was a great deal of motion on the part of the operators, which was not work ; the operations should have been completed in the time consumed by some operators in preparing the cavities.

Dr. Black: Asked if the last speaker, in saying the burr drags away nerve fibers, meant to convey the idea that it entered the pulp or that there are nerves in the dentine.

Dr. Crouse: Believed there were nerve fibers in dentine, although this was a question that had troubled many wiser heads, and had not yet been positively settled.

Dr. Black: Wished to urge strongly the point of having a definite plan of operating, before commencing the operation. Time should not be wasted after an operation is begun and the patient is being hurt. Every cut should be made to count. Often could work to better advantage without the burring engine, but he found it generally the best thing to deaden sensibility.

Believed in removing foreign deposits from the teeth to be operated upon.

Dr. Talbot: Spoke against the waste of time in operating by false motions, and advocated the use of straight pluggers for condensing the gold.

Dr. K. B. Davis: Thought while the criticisms on the length of time consumed in operations were eminently proper in every day practice; yet it ought to be remembered, that in a clinic, it was impossible for any one to operate as rapidly as under ordinary circumstances.

BLEACHING TEETH.

By Geo. H. Cushing.

In addressing you upon this subject, I do not expect to tell you anything new, nor do I assume to understand it theoretically. I only speak to you upon it at all, because of a seeming desire on the part of some to have the subject presented. It is always desirable that professional men should understand the principles involved in governing any of the processes or methods of practice pursued by them, as thereby more intelligent, and consequently more successful modes are likely to be followed. In endeavoring to lay before you the principles governing the process of bleaching, I shall only give you the words of eminent authors on the subject, whom I have been able to consult.

The facts—scientifically considered—concerning this process seem to be but imperfectly understood, and there has, as yet, been no positive conclusion arrived at concerning the chemical changes which take place.

Ure says under the head of "bleaching:"

"The true theory of bleaching has not been entirely agreed upon, but there can be little doubt of the principal operations.

"It is known that oxygen deprives substances of color; this may be performed by many high oxides; by nitric acid, manganic and chromic acids and chlorous acid. The same effect may be produced by chlorine, bromine and iodine."

The new Encyclopedia of Chemistry, regarded as one of the best works of the present day, says under the head of bleaching:

"Modern writers seem to agree that the principal action which takes place during croft bleaching (*i. e.* bleaching fabrics on the grass), is the combination of the oxygen of the air with the coloring matter, resulting in a compound which can be dissolved out by water or alkaline liquors, or boiling."

From the same work, under the head of chlorine, we find:

"Chlorine acts powerfully upon all vegetable and animal substances, and its action consists in combining with some (or sometimes the whole), of the hydrogen, which is a *never* absent constituent of all animal and vegetable tissues. Upon this property of chlorine rests its application in bleaching."

"Chlorine may be obtained by heating aqueous hydrochloric acid with peroxide of manganese."

From Wagner's Technology, under the head of chlorine, we find:

"The bleaching property of chlorine gas, possessed also by its solution, is due to the great affinity of chlorine for hydrogen, so that the chlorine when seizing upon the hydrogen of the organic body, in most instances, causes the simultaneous decomposition of water, and by the formation of ozone destroys the organic coloring matter; hydrochloric acid being at the same time formed."

From the same, under the head of sulphurous acid, we find:

"The bleaching property of sulphurous acid may be considered as due to two entirely different causes. In some instances the pigment is only masked—not destroyed. Sulphurous acid enters with some pigments into a colorless combination; in other instances, however, a real decomposition of the pigment takes place. The former condition obtains with most of the blue and red flowers and fruits; a red rose bleached by sulphurous acid, has its color restored by immersion in very dilute sulphuric acid. The pigments of yellow flowers are not affected by sulphurous acid; it also does not at first act upon indigo and carmine, and the yellow color of raw silk; but by the combined and continued action of this acid and direct sunlight, the oxygen of the acid acts as ozone and determines the bleaching."

From Brande & Taylor's Chemistry, under the head of chlorine, we find:

"The bleaching agency is explained by the evolution of nascent oxygen, resulting from the decomposition of aqueous vapor or water."

I might quote to you, indefinitely, from various authors who hold the same general and yet somewhat diverse opinions as to the precise action which determines the bleaching. One author thinks it very probable, that in all bleaching, by whatever intermediate agent brought about, the active influence is always ozone or nascent oxygen. Others, again, lay great stress upon the the influence of the actinic ray.

Thus I have endeavored to place before you briefly, all that is at present known, theoretically, upon this subject, and I think it may be of service to some who may hear me who have not studied this subject, as giving some scientific ground upon which to base hopes of success. I know that some persons are very skeptical regarding the possibility of bleaching badly discolored teeth, and I am sure the skepticism is sometimes due to the want of knowledge of the principles governing the process. Of course the matter of greatest interest to us is, how to do it; the practical treatment is most anxiously sought for, rather than the theoretical doctrines, and I will endeavor to state what I know about the matter, so that any person, if disposed, may treat such cases with reasonable prospect of success.

It would be well, probably, in treating of the practical aspect of the subject, to consider: first, the cause of discoloration and the character of the pigment we are to destroy; second, the character of the tissue we have to bleach, and finally, the agents and the method of employing them, best adapted to secure the most successful results.

First, then, as to the cause of discoloration. It may be stated, I think, as the general opinion, that the discoloration which follows the death of the pulp of the tooth, arises from the hæmatin or coloring principle of the blood. As to how that becomes lodged in the dentinal tubes, I confess myself unable to state, and I do not remember to have read of any explanation of the process. My own impression is, that the red blood, as a rule, does not penetrate the dental tubuli, only the liquor sanguinis, and I am not aware that that carries the hæmatin. I suspect but little can be known as to this point, and my own judgment leads me to the conclusion that the coloring matter is not carried into the tubuli from the blood, but that the change of color takes place, by reason (perhaps) of the oxydation of the contents of the tubuli, which are left there cut off from the usual nutriment after the destruction of the pulp, and which must undergo certain physical changes, although it is impossible for us to say what. There is but one other frequent source of discoloration that I am aware of, and that is from the oxydation of amalgam in the filled cavity.

Second, as to the character of the tissue we have to bleach—I need hardly go into any detailed statement of the general characteritics of dentine. Briefly it may be stated that we have to operate upon a more or less dense material, which holds within its tubuli the offensive pigment, and that in proportion as the dentine is soft or porous will be the success attending our attempts to bleach.

I know that many persons say: I don't see how it is possible to bleach so dense a structure as that of the dentine, under the unfavorable conditions surrounding its treatment in the mouth; many do not believe that the bleaching material can penetrate deep enough to do any good. It must be remembered that however dense the structure, it is permeated throughout with moisture, and that wherever the moisture is, the *chlorine*, if that is the agent used, can reach in process of time. The strong affinities between the chlorine and the hydrogen of the moist tissue overcome barriers that would seem almost insurmountable. With teeth not dense, we see the operation of the bleaching agent sometimes instantly, while in those of very hard and close texture, its operation may not be observed for a long time.

Finally, as to the agents and methods of employing them. The agent that in my own experience is most to be relied upon, is chlorine; and I think it is the one most generally employed. In a very large majority of cases, it will be found to be all sufficient, or at least, more efficient than any other agent. Still there are some cases in which nitric acid may be employed to better advantage than the chlorine; many other agents have been suggested, such as oxalic acid, peroxide of hydrogen and some others. I have personally no knowledge of the action of any agent except chlorine, nitric acid and peroxide of hydrogen; and of the latter only from one trial, in which it failed to act promptly, and I performed the bleaching with chlorine. Nor am I aware of any success that has attended the use of any agents, other than the chlorine and nitric acid, that would place them higher in value than others. That it would be desirable to find some agent more powerful than these, is certainly true, as in a few cases we fail to secure as good results as we desire with any agent now practically known in this connection. Perhaps the suggestions thrown out in this paper, may stimulate some of you to the research and experiment which will bring us the desired article.

Nitric acid has been suggested as particularly indicated where the discoloration is due to the presence of metalic oxides. Theoretically,

this is undoubtedly correct, and probably would be practically; but as I before remarked, it is impossible sometimes to determine whether such oxides are the cause of the trouble, and in many cases where we do not think the discoloration due to metalic oxides, still the nitric acid bleaches more thoroughly than the chlorine. It can only be determined by experiment, whether it is better or not, and in cases where the chlorine does not accomplish as much as we desire, the nitric acid may very properly be tried.

Now, as to the mode of applying these agents, and the general treatment of such cases:

The rubber dam should be applied, and the discolored dentine cut away as extensively as is consistent with the strength of the tooth. If chlorine is to be used, the preparation known as Labarracque's solution of chloride of soda, or of lime, is probably the best that can be employed. Pure chlorine gas has been used, but I believe the testimony of those who have tried it, does not warrant its recommendation over the solution just named. When the cavity is thoroughly excavated, a small pellet of cotton should be dipped in the solution, and then touched to little powdered alum, and immediately applied to the cavity and allowed to remain there for ten or fifteen minutes. The cavity should then be washed out and dried, and the application repeated, and repeated as often as may be necessary to secure the best results. The alum is used simply because the chemical action which takes place, liberates free chlorine, which is then nascent and acts more powerfully and rapidly than it otherwise would in the solution alone. It may be necessary to repeat this treatment at two or three sittings, pursuing it for from one to two hours at each sitting. In the majority of cases, this treatment will secure very satisfactory results. When the tooth is ready for filling, it may be lined upon its labial side, with oxychloride of zinc if desired, which will in some cases aid greatly in restoring the natural color. Where nitric acid is used, it may be applied in the same way on a small pellet of cotton, but should not be left so long—only from two to five minutes—and after the bleaching is finished for any sitting, the cavity should be thoroughly washed and rewashed with a solution of bicarbonate of soda, or some other alkali, to thoroughly neutralize any acid which might remain in the tooth.

In the use of the peroxide of hydrogen, it is applied in the same way upon a bit of cotton, but I have not much hope, from my own experiment, that it will prove any better or as good as the chlorine.

This, I believe, covers the entire ground of the methods of treatment. They are very simple, and all that is needed to ensure success is faith and patience. We should not give up, because we fail to get the results we want in a minute, or an hour, but persist until we have demonstrated that no more can be accomplished, and then accept the result, whatever it may be—like philosophers.

Now, after all has been done, as above described, you will sometimes fail to secure as good results as you hoped for. There are some cases that apparently will not yield to treatment beyond a certain point, and some few that are but little improved; but very few indeed that cannot be improved somewhat, and most of them almost restored to their natural color. In some cases, again, you will find the main part of the tooth fully (or nearly so) restored, while at the margin of the gum, the tooth will present a quite dark line still, that cannot be lightened by any prolonged treatment. Why this is so, I do not pretend to say, I only state the fact.

A word should be said, before closing the subject, upon the effect which these agents may have upon the integrity of the tooth structure. Many people believe that a tooth cannot be bleached, except at the expense of its strength and durability. Theoretically, this is doubtless true, but practically, I am sure it is not. I am certain that I have never seen any destructive effect of any of the agents named, even from the most prolonged and repeated bleachings, and no man need feel any anxiety in that regard, if he uses his agents properly and allows himself to be guided by common sense. The purpose of this paper will have been secured if it shall render clear to even one of you to whom it was previously dark, the subject of which it treats; and I leave the subject with the hope that some may be induced to try this treatment who have not heretofore pursued it.

DISCUSSION.

Dr. Harlan: In what strength should nitric acid be employed?

Dr. Cushing: Full strength. There seems to be an erroneous impression as to the effect of these bleaching agents upon the tooth structure. Has a couple of teeth with him which were in chlorine sixty hours, and they are structurally unimpaired.

Dr. Black: Cases of discoloration are often due to hæmatin, from the disorganization of the pulp or blood that has entered the pulp cavity. It is not necessary that the blood globules should have entered the tubuli, but their coloring matter alone is sufficient to produce the discoloration of the tooth. A large number of cases are due to the sulphuret of iron, which is necessarily formed during the disorganization of the pulp. This is why a piece of meat, when it decays, turns black. In a tooth whose pulp chamber has become filled with serum, gases form and drive out other materials and leave the cavity dry. A residue is left which is carried into the tubuli by an influx of serum, and the process is recurrent until the tooth is blackened with sulphuret.

He found in the root of a tooth, a piece of a nerve broach, which gave rise to the formation of a large amount of sulphuret of iron, and the tubuli were black to the very extremities. When macerated in turpentine and mounted in balsam he found this specimen black with sulphuret of iron.

Dr. Clark: Do not teeth that have been bleached turn dark again?

Dr. Cushing: Has known them to blacken somewhat again, though never altogether. Why this was, he did not know.

Dr. Crouse: Wished to encourage those who have not much faith in bleaching teeth to make the attempt. They would find some very encouraging results from the treatment laid down in the paper. Following up the treatment several times at one sitting, is important, and frequent scrapings of the cavity will hasten the result.

IS DENTISTRY A SPECIALTY OF MEDICINE?

By C. Stoddard Smith.

The common, in fact almost universal and generally accepted answer to the question contained in the caption is, that dentistry *is* a specialty of medicine. That such is the case has been assumed by colleges, which embody this idea in their announcements and curriculums; by societies which so state in their constitutions; and by writers, journalists, and practitioners generally.

In this paper we shall take issue with this view of the matter, and shall present such reasons as occur to us in support of the proposition that dentistry *is not*, or at least *ought not to be*, a specialty of medicine.

If dentistry *was* a specialty of medicine, it would follow that the medical text books and curriculums should embrace a more or less complete exposition of dental science; that a medically-educated man would *by virtue* of his medical education and knowledge, be at least measurably fitted to practice dentistry. Are these propositions true? Is either of them true? Let us see.

First, do the medical text books contain, and do the medical professors teach, anything which by any means could be considered an approach to correct dental teachings? It is notorious that they do not, as could be abundantly shown by extracts from standard medical works, which want of space will not permit us to make.

Incomplete, as applied to these teachings is not the word; *inaccurate* is better, but does not express the fact; ridiculous nonsense is nearer to it in many cases. These books show that the writers, eminent men in their profession, had not the slightest idea of the true cause of dental troubles, or their appropriate remedies. This is not to be wondered at. It is but a short time since they were, on strictly *medical* subjects, floundering in the depths of ignorance; treating diseases as "humors," blistering, purging and dosing in a wholly empirical manner; and,—the more's the pity,—they have not wholly gotten over it yet. But does this indicate that they are competent to teach dentists what they need to know in order to practice dentistry successfully? Do the teachings or the books in any degree fit the student for such a practice?

Then, second. Is a medically-educated man able, *by virtue of* his medical education, to practice dentistry properly? A moment's reflection will, I think, convince a thoughtful and observant mind that such is not the case. Every one of you *knows* it is not. You know, and I know, that if the preservation of our own teeth, or those of our families, depended upon the treatment they could receive, not from the young medical graduate merely, with the odor of the hospital and dissecting-room still clinging to him, but from the educated and talented physician or surgeon, of large experience and great success, posted in all the literature of the profession, eminent in diagnosis, we should stand but an exceedingly slim chance of retaining any of them

longer than Dame nature and the destructive influences of the mouth would allow them to remain. Imagine yourself for a moment, with a carious cavity in close proximity to the pulp, and dependent for treatment upon the village doctor, or even on the most skillful medicus you can call to mind. Do you think you would sit calmly and allow him to scrape and punch that tooth because he was a fine anatomist, or because he had eminent skill in the treatment of typhoid or scarlet fever? In all candor, would you not rather trust the village jeweler, (supposing him to be an intelligent man,) to whom in a half hour's talk and demonstration you could explain the location of the pulp, and the operation necessary? We had almost said would you not rather trust the village blacksmith, or the machinist from the shop? For our own part, we would not only sooner trust the jeweler, but if we wanted to make a successful and a skillful dentist, we would select the intelligent jeweler, or even machinist, in preference to the doctor, and there would be reason in the choice. The training in the one case would have been in the line of the daily requirements of the dentist; in the other it would have been in quite another direction. Medical education, be it ever so thorough, does not in any degree qualify, it does not even *prepare* its possessor for dental practice; at least not nearly as much so as does the work of the jeweler, or mathematical instrument maker, who are accustomed to handling delicate instruments and to making fine adjustments. Even as regards the comparatively simple and measurably surgical operation of extracting teeth, do you know any, or at least many general practitioners who perform it with any degree of skill? Do you not have any number of broken teeth coming from them as an evidence of their bungling when they attempt to perform what ordinarily is but a simple operation of what is claimed to be only a "specialty of medicine?" If we are to judge what they know of their profession by what they know or what they can do in what is claimed as a specialty of that profession, they are but a sorry set of men to be intrusted with the life and health of their fellow creatures. I have a better opinion of them than that. I believe their knowledge and ability on *this* subject, is not an index of their skill and success in their own department. They *do* know medicine, but they *don't* know dentistry; and the best of them know they do not. The more intelligent and enlightened they become as regards dentistry, the less they want to meddle with it or its operations, unless indeed they become dentists.

So much for the skill; now for the knowledge. I need but to refer to the oft-told tales of doctors who treat alveolar abscess for months supposing it to be erysipelas, who treat neuralgia as a constitutional disease, because the "teeth are all sound," or have fine "solid" fillings in them; who do not know that a wisdom-tooth may cause almost any trouble about the face; of the surgeons who gravely pronounce an old root covered with salivary calculus, to be an "osteosarcoma"; of the almost universal practice of the M.D.'s who prescribe acid medicaments in blissful ignorance or willful disregard of their effect upon the dental structures; of the doctor who assures the parent that the sixth-year molar is a milk tooth, and should be extracted. Every one of us has seen more or less of this sort of thing; every one of us knows that these accounts are usually accompanied by the statement that the thing was "done by one of our *best* physicians." These things show, not only that medical men, *as such*, have no *skill* in dentistry, but that they are wofully deficient in *knowledge* as well; in fact, they are but little above the intelligent non-professional in either respect.

And further; do medical men necessarily or even usually make the most successful or skillful dentists? We will not say what has been said, that *M.D.* stands for miserable dentist; but we will say that in our opinion, as a rule the *M.D.* members of the profession are not at least any better than the rest; and we do not believe they will average in ability as well as an equal number of equally intelligent non-medical men. Call to mind those of your acquaintance and see how they stand. Go abroad and see how the long, scholastic and medical European training makes fine operators, or rather see how it does *not* do it.

The main reason, as we understand it, for claiming that dentistry is a specialty of medicine, is that the teeth are a part of the human frame; that they and the adjacent parts are subject to disease; and that he who treats those diseases properly must understand the human frame, and the treatment of disease; *ergo* he is a physician. Indeed it has been broadly stated that if we are not medical specialists we are a set of carpenters. But let us see if this statement is really true—if this conclusion necessarily follows. Granted that the teeth are a part of the human organism, and subject to disease, which none will deny. Granted that a knowledge of anatomy, of physiology, of therapeutics, is necessary to the proper treatment of dental lesions. Does it follow because the medical man must also study these,—because both he and

the dentist are obliged to get a part of their preliminary information from the same text books,—because certain knowledge underlies both professions, that the one is a branch or specialty of the other? All knowledge is founded upon certain substructures which are common to all branches alike. What sort of an argument would it be to say that architecture was a branch or specialty of astronomy, because both the architect and the astronomer must understand mathematics, and must occasionally use the rule of three in working out their problems; because both make drawings upon paper to record the work of their brains? Shall we say that pharmacy is a specialty of medicine because both require a knowledge of drugs and chemicals? Shall we say that the maker of artificial legs is a medical specialist, because he would need to understand the anatomy of the leg in order to construct his substitute, and because he has to deal with living tissue when applying it? The temple of science is not a collection of columns, each standing upon its own pedestal, and each crowned with its appropriate bust or sculpture. It is rather a magnificent edifice, whose foundation stones are planted upon the solid rock of truth, and are interlaced and interlocked; its lower stories are all communicating, and all subservient to the uses of the upper parts, from which rise the several spires, cupolas, turrets, minarets and towers devoted to the various branches of science and art, differing, it may be, in architecture, in height, in magnificence, but all alike parts of one harmonious and imposing whole.

It is true that the dentist and the physician must have much knowledge in common; but it is not therefore true that dentistry is a branch of medicine. Though there is much in common, there is more that is not so. What has the physician (as such) to do with metallurgy and plaster-of-paris, and sand and zinc, and tempering steel; with the cohesive properties of gold, the proper vulcanizing point of rubber, or the manipulation of celluloid? What does he know,—what in the nature of the case *can* he know, about the thousand delicate manipulations of the skillful dentist? His time and brain are full of symptoms and doses; if he knew ever so much dentistry he would not be able to use his knowledge. What has the dentist (as such) to do with obstetrics, with ophthalmology, with cardiac disease, with lung or liver disease, with cerebral disease, with venereal disease? Why should he waste his time, and that to no purpose, in studying these diseases, their symptoms and their treatment? We

say waste his time, not because such knowledge is not desirable, and might not be valuable; so might a knowledge of chemistry, or of many other things; but who expects a dentist to be a thorough chemist, and how is it possible for him to be one? Chemistry is not a by-play, a thing to be mastered in odd moments; it is a life-study, and enough so to engage the ablest minds. We say waste his time, because all the knowledge that he might obtain from books on these subjects, or even from a hospital experience, should he have it, would be utterly useless to him in his life work; not because he might not have occasion to use it, but because when wanted he could not depend on it. Such knowledge, to be of any practical use, demands not only preliminary study and clinical experience, but constant and ceaseless observation and practice in order to render it of any reliable service, which, by the nature of the case, is out of the question. Which of you, if you filled a tooth but once a year or once in five years, could do justice to the work? What graduate (unless he be possessed of an exceptional memory), can tell three years after commencement the names of the muscles, or the bones, or the origin and function of the nervous trunks? Who of you would trust the life of a dear one in a crisis, with a man who, though he might *know* the symptoms of the fever, was not practically familiar with the thing itself?

We say waste his time, not because there is not much in these things that is desirable and proper for a dentist to know, but because it is utterly impossible that he should know all or even any considerable portion of what is just as desirable and proper to be known. Dentistry itself is a life-work, a life-study; it takes a whole man to be a dentist, and it should occupy the whole attention. For a man to undertake to thoroughly master all that is collateral to it, would be like the attempt of the landshark to buy all the land that joined him. He would soon find himself upon a limitless expanse. The thing is impossible; it cannot be done. To attempt it would be to frustrate the objects aimed at, for no time or strength would be left for the thing itself. And when it comes to choosing, as it certainly must come, it is the part of wisdom to choose that which will best fit one for the practical realities of one's chosen pursuit. In ordinary education this is being more and more generally realized; it is recognized that the study of the classics and other branches, do not tend to fit men,—indeed it is sometimes claimed that they *unfit* them—for the practical business of life; and, consequently, technical and polytechnic and

other practical courses of study are more popular than classical. The ideal dentist may be fully educated in chemistry, in metallurgy, in physiology, in therapeutics, in anatomy, and all kindred and cognate sciences; but that ideal dentist will never exist while flesh and blood and human capacity remain as they now are, simply because his existence would involve physical impossibilities.

Let us not be misunderstood. We go for the broadest, the highest, the deepest culture possible, in all departments of human activity. But life is short and art is long. It is given to but few men to become possessed of eminent or even of tolerable knowledge in more than one department; it is, in fact, given to but few to become really eminent in even one department. The great mass must rest content if they attain sufficient knowledge to enable them to become efficient workers in any single department of the world's great work-shop. But let every man *first* possess himself of just as much preliminary education as his position, means, and ambition will enable him to get; then, having settled upon his calling, master that; *afterwards*, let him acquire just as much collateral or other knowledge, as his situation and justice to his chosen occupation will permit. But let him not fritter away his energies in an attempt to make a quart measure hold a peck, or a blanket cover an acre; to master all the branches of medicine because he wishes to be dubbed a specialist.

Far better will it be, both for him and his patients (if he is to be a dentist), that he spend his time and powers in obtaining that skill which he will need every day, and of which there is no danger of his having too much.

But it is said that the greater includes the less, and that anything else than a full M. D. is but a "partial culture." The greater does include the less; but who said that dentistry was less than medicine? That is assuming the very point under discussion; arguing in a circle. Those who claim that dentistry is a specialty of medicine, would make it *less; we* claim that it is the proud *peer* of medical science. Not in age, it is true; we cannot look down the vistas of the past and see an unbroken succession from the times of Galen and Esculapius. But in our vigorous young manhood, in the skill and certainty we have attained in the performance of our operations, in the "good that we can do" to suffering humanity, palliative, remedial and prophylactic, we are certainly the peers of any craft, profession or calling, be it ancient or modern, be it professional or mechanical. We are *not* "the less," nor are we included in the greater.

"Anything short of a full M. D. is a 'partial culture.'" We have shown in what seems to us an unanswerable argument, that an M. D. does not imply, or even indicate, a capacity to practice dentistry. As to the statement, that an education which fits a man only to practice dentistry, is but a "partial culture;" we admit it; it *is* but a "partial culture." But show us the inhabitant of this sublunary sphere, who has anything else than a partial culture. What title conferred by mortal man, indicates that its professor has mastered all that is to be known; that no worlds in the realms of knowledge remain for him to conquer; that all the cosmogony and theology, of the here and the hereafter, is to him but as a lesson learned? A "partial culture," it is true; but alas for human nature; it must await translation to another sphere, where knowledge and existence are alike infinite, before it can hope for more than this. A "partial culture;" yes; but Newton, the great and erudite philosopher, to whose acquirements, few if any, can aspire, much less attain, was forced to admit at the close of his life, that so far from crossing the great ocean of knowledge, all that he had done was to stroll along its shores and gather a few pebbles from the beach.

The fact is, and it cannot be disputed, that nine-tenths of the practice of dentistry, is mechanical. It is worthy of notice, that the more completely we accomplish that thing in regard to which we talk so much, and we fear accomplish so little—the enlightenment of the public—the more complete the mechanical character of the practice becomes; that is, the better care people can be induced to take of their teeth; the oftener they submit themselves and their children for treatment, the less of disease as such, as distinguished from dental caries, we will have to take cognizance of, and the simpler our operations as a whole will become. If dental caries is a disease at all, the treatment of it (simple caries of course, we mean) is purely mechanical. And sometimes we think that with all our boasted progress, we who can circumnavigate the globe, can put a girdle around the earth in forty minutes, can tunnel under lakes, and rivers, and mountains, can talk through wires, and make the lifeless iron speak, who can count the very stars of the heavens, and weigh the sun as in a balance; ought to be ashamed of ourselves when we are compelled to admit that we cannot put a gold filling into a little miserable cavity in a tooth, so that it will arrest decay, or find something else that will do it.

But dental practice is not *all* mechanical; else it were a trade as is the tinker's, as it was when it began, or as is the barber's trade to-day. It requires with this mechanical dexterity, education of the brain, to know the characteristics of the parts on which it operates; it requires judgment, study and thought all the way through, and these constitute it a profession. But it is a pursuit *sui generis*, of its own exclusive kind, and as I maintain, separate and distinct from all the rest. An education of the fingers far exceeding that of most of the trades; education of the head as well as the hand; judgment, skill, dexterity, and all of the highest order; are not these qualities sufficient to give us a foundation upon which to rear our own edifice, without asking to be attached like a lean-to to the great temple of Esculapius? Do we gain dignity by clinging to the coat-tails of medicine, clamoring for "recognition," instead of standing boldly up and proclaiming ourselves, as did the infant colonies, free and independent? Away with such servile cringing; such degrading sycophancy! *They* do not want us within their doors; let us manfully stay outside, and show them that while we understand *our* business, we do not claim to understand theirs. Let us show them that we mean to be *dentists*, and not medical specialists. Let us know enough of the branches common to both professions, to enable us to consult with them intelligently; enough of their profession to know when we should hand our patients over to them. Let us respect their rights and knowledge in their department, as we ask them to respect ours, and not interfere with their pills and powders, or undertake to treat teething children or miasmatic influences. Let us ask them to study so much of our professional knowledge, as to know enough when anything is the matter in the region of the mouth, to consult an intelligent and skillful dentist, and be willing to abide by his advice; and let us during such intercourse, not endeavor to create the impression upon the mind of either the physician or patient, that we are physicians, which we are not, and understand medicine, which from the nature of the case we cannot; but rather let us show by our conversation and opinions, but above all, by our operations, that we are *dentists* and understand *dentistry*. Let each profession know thoroughly so far as necessary to each, those branches which underlie both in common; let us know in addition, all we can of the other's profession, as we do of all other knowledge which goes to make us intelligent, educated and well informed citizens. Let us make both the medical profession and the

community respect our skill and attainments; but do not let us lay claim to being what we are not. Thus, side by side, and hand in hand, let the two sister professions go together, each according to the other, all the honor, dignity and knowledge to which each is entitled; fraternizing and consulting with each other and laboring together, and in unison, for the good of our fellow men.

DISCUSSION.

Dr. Black: Did not think the paper went over the right ground. It doubts whether a medical knowledge is necessary, but yet cannot possibly get to the end without admitting that the dentist, to consult with the physician, would require a knowledge of medicine.

Almost every dentist has felt that he needed to know something of other diseases than those of the teeth. Throughout his practice, he will be more successful the better he understands the laws of general and specific diseases. The oculist, though a specialist, gained his knowledge in a medical college, and the speaker believed the time would come when there would be a chair of dentistry in every medical school.

We must be either "tooth picks" or we must understand the laws of diseases and remedies.

Did not mean that dentists should be posted on details of treatment of all diseases, but they should obtain a good general knowledge of pathology, and where could this be obtained but in a medical school? The time has come when our profession must go either up or down; it must go up through its understanding of these things.

Dr. Cushing: Did not care whether we were called medical specialists or not; but we certainly must strive to become first-class dentists, and he knew of no other way than through a knowledge of medicine.

We do not want to become medical practitioners, but we should have a knowledge of the general principles of medicine. If these do not underlie our specialty he did not know what did.

Combining dental schools with established medical schools, it seemed to him, was the better plan, in order to furnish the best advantages to the student.

Dr. Crouse: Was pleased with the writer's enthusiasm, but does not like the effect a residence in New Jersey has had upon him. If dentistry was merely to stuff a tooth with gold, he could make an operator out of any boy without any previous special training.

Is it not the province of the dentist to instruct the parent in matters requiring a knowledge of physiology ?

All the dental colleges attempt to teach something of medicine, but he should prefer to go where this knowledge is supplied thoroughly and completely, and what better place could there be than a medical college. Was sorry he did not take a course in one before entering his specialty.

Dr. Dean: Agreed with the statement that we should have all the education we could hold—but it must be of the right sort.

A dentist should have such education as will qualify him to occupy the place of a professional man. We must, however, discriminate between what was necessary and what would be superfluous. In an entire medical course there are many things which would be of no use to us as dentists, and the time occupied in grasping them can be more profitably occupied in the study of things of more special value to us.

Dr. K. B. Davis: Believed he could teach a man more of dentistry in three years, than a medical man who does not know dentistry, which, if dentistry was merely a part of medicine, ought not to be so. It is well enough to get all the knowledge we can, but let it be of the right sort.

Dr. J. A. W. Davis: There seems to be an impression that the study of medicine takes away a man's adaptability for the practice of dentistry. He had never seen any one who had more knowledge than he could hold. Was of the opinion that the teeth were not isolated, but were closely connected with the other organs of the body, of which we ought to know more. The tendency of our profession is toward greater education. A medical training of itself does not prepare one for the practice of dentistry without additional special study ; but let the future dentist have this general training before entering upon his special studies, and see how much further he will go than we have been able to progress.

Dr. C. S. Smith: Did not expect that this paper would be generally endorsed, but it is plain that he had been misunderstood, and he was sorry he had not made himself clear. No one who knew him

would believe that he would under-value education. He did not depreciate any amount of education, preparatory or otherwise; wanted a man to get all that he possibly could, but where only a portion is possible, he wanted that to be the most important portion. He believes we do need physiology, and anatomy, and hygiene, but these are not medicine; they are only fundamental to that profession, as they are to ours. It is said by Dr. Cushing, that no one claims that we are medical specialists. He would ask if there was not a series of resolutions passed unanimously by the American Dental Association, with a preamble which read: "*Whereas*, dentistry is a specialty of medicine," etc. This idea is almost universally accepted. These are no newly adopted views of his—no "Jersey notions"—but on the contrary, he has long thought that we should be a distinct profession, and he believes time will verify his views. He does not think those who attack the paper differ with him in reality as much as apparently. The difference, he thinks, will be found to be more in regard to the names of things than as to the amount and kind of education.

CELLULOID.

Dr. C. S. Smith, in charge of the Dental Department of the Celluloid Company, was, by vote of the Society, requested to make some remarks upon this subject. (See Resolutions on page 11). He spoke as follows:

I have nothing very important at present to say in regard to Celluloid. Since my connection with the company began, I have been endeavoring to become acquainted with the business, and hope that some improvements will be effected. Some have been already made, such as adding new forms of plates, and a thickening of all the plates in the centre, and there is reason to hope that others will follow, more especially in regard to the permanency of the color. There are good reasons for all the failures which have been made; some of which have been on the part of the dentist, and will be remedied by a little study of the subject, and careful attention to the published instructions which have been prepared in pamphlet form for distribution, and will be furnished to any applicant. Others were connected with the manufacture of the material, and have been gradually overcome, and the processes

made more perfect, so that without a doubt the material which has been made for a year and a half is much better and more uniform than any preceding. This material, owing to the large stock on hand, is really only just coming into use. A general feeling of satisfaction among those who use the base is manifest, and its popularity is constantly increasing. A variety, differing somewhat from that ordinary used, and known as the "opaque variety" has been manufactured, more for trial than otherwise, which, it is believed will be more satisfactory as regards permanency of color. This kind of plate will soon be in the market. Some improvements are also contemplated in the machines.

EDITOR'S TABLE.

Owing to the delay of the shorthand reporter in furnishing the transcript of his notes of the discussions, it has been impossible to issue the present volume as early as usual, but it is hoped that it will be none the less welcomed, nor the less carefully perused because of its tardy appearance. We are confident that the dilligent reader will find at least abundant food for thought in its pages.

Do not fail to read the advertisements.

Jas. H. Ashmead & Son of Hartford, Conn., manufacturers of Gold Foil, etc., are endorsed by a business existence and reputation of forty years.

R. S. Williams of New York, and his productions—especially his cylinders—are so well known that anything we could say in commendation would be superfluous.

Dr. Ambrose Lawrence of Boston, still furnishes his "Lawrence's Amalgam," and has 'just a little left.'

Dr. L. D. Caulk of Camden, Delaware, comes before us with a new article, claiming our attention—Diamond Point Gutta Percha. The late Secretary of the Illinois State Society, Dr. Swain, to whom were given the specimens of this article sent to the Society at Rockford (see page 8, this volume), informs us that the material, when worked according to the directions, becomes harder and more resistant than any similar material previously in the market.

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